THE IRON TRADE REVIEW

Volume LII CLEVELAND, JUNE 5, 1913 Number 23

Decided Increase in Buying in Eastern Market

And Inquiry for Basic Has Improved in Pittsburgh—Agricultural Implement Makers Place Contracts for Bars—Shading on Wire Prices

BY GEORGE SMART

The most important development for a number of weeks in the pig iron market has been the very encouraging increase in buying in eastern territory and much more active inquiry in the east and in the Pittsburgh district. It seems that at last many buyers have come to the conclusion that it is time to at least make a thorough investigation of market conditions. The probability that there will soon be an active buying movement is much stronger. New inquiry in the Philadelphia and New York district is conservatively estimated at about 50,000 tons, of which half has developed into orders. The American Locomotive Co. has closed for 6,000 tons of foundry iron for third quarter, of which 4,500 tons for Dunkirk and Schenectady plants was awarded to a Buffalo maker on a basis of $14.50, furnace, for No. 2X. The Warren Foundry & Machine Co., Phillipsburg, N. J., has closed for from 8,000 to 10,000 tons of No. 2 plain and forge. The Trenton Malleable Iron Co. is inquiring for 2,000 tons of malleable and a number of other malleable inquiries are in the market. Malleable can be had at $14.75, Buffalo, and perhaps this price could be shaded 25 cents on desirable business. Much more hopeful feeling prevails at Pittsburgh, where inquiries are pending for about 25,000 tons of basic. Foundry iron is, however, dull throughout the central west, and the southern market is weak. There is no new business in basic in the east, but a fair tonnage is going in low phosphorus.

Pipe

Following the advance on standard steel and line pipe of $1 a ton, announced last week, water-well casing has been advanced from $2 to $4, there has been a general advance in oil country goods, some sizes of boiler tubes have been marked up $1, and makers of standard weight iron pipe have advanced their price $1.00 per ton.

Pig Iron Production

The production of pig iron by the coke and anthracite furnaces in May was the greatest in the history of the trade, the tonnage being 2,815,336, compared with 2,754,353 tons in April. January of this year had previously held the record. The number of active stacks on May 31 was 285, a loss of 12, compared with the last day of April, the largest loss in two years. The blowing out of furnaces indicates that there will be a sharp decline in production this month. The merchant furnaces made the principal gain last month, but eight merchant stacks were blown out last month and only one relighted.

Iron Ore Shipments

May was likewise a record-breaking month in the movement of iron ore, the shipments from the Lake Superior region being 7,284,212 tons, the greatest for any May in the history of the lakes. Owing to the unfavorable weather which prevailed during a large part of the month, this showing is indeed remarkable and indicates that the fleet could easily handle 50,000,000 tons during the season. The only question is as to whether trade conditions will justify such a heavy movement.

Steel Bar Contracts

Agricultural implement manufacturers who have been hesitating about buying bars are showing more disposition to contract and one middle western concern has closed with an independent maker for 45,000 tons for shipment for the year beginning July 1, 1913. Bar manufacturers declare that reports of a lower price than 1.40c are without foundation. The declines in the prices on plates and bars have consisted of settling down to the quotations which have long been made by the leading interest. There have been very few cancellations and suspensions and consumption continues heavy.

Wire

The wire market is dull and there has been considerable cutting, but the American Steel & Wire Co. continues to quote 1.80c on wire nails, and 1.60c on wire to jobbers. The usual quotation of $30 on wire rods has been shaded $1. The rivet market is weak and some very low prices have been made by one or two small manufacturers. Large manufacturers are maintaining prices fairly well, but there has not been enough new business to test the market.

Pig Iron Production Over 2,800,000 Tons in May

While Number of Blast Furnaces Blowing Out is Greatest in Two Years—Steel Works Stacks Make New Record

Returns giving the production of coke and anthracite pig iron in May show two directly opposed records were broken last month. The output exceeded 2,800,000 tons for the first time in history, while the number of stacks blowing out was the largest in two years.

The output last month was 2,815,336 tons, compared with 2,754,353 tons in April, a short month, a gain of 60,983 tons. January of this year was the previous record-holding month with 2,787,800 tons.

MONTHLY PRODUCTION RECORD.

	Tons.
October, 1907	2,359,690
September, 1909	2,375,589
October, 1909	2,604,037
December, 1909	2,682,702
October, 1912	2,683,645
December, 1912	2,777,292
January, 1913	2,787,800
May, 1913	2,815,336

The number of active stacks on May 31 was 285, against 297 on the last day of April, a loss of 12. Exactly two years ago, May, 1911, showed a loss in active furnaces of 14, while since June, 1911, there has been a constant gain in the number of stacks in blast with two minor exceptions, exclusive of the flood period of two months ago.

AVERAGE DAILY PRODUCTION.

	1913	1912.	1911.
January	89,929	66,220	56,989
February	92,095	72,372	63,617
March	89,123	77,791	69,863
April	91,812	79,254	68,163
May	90,817	80,753	60,367
June	.....	81,125	59,109
July	.....	77,502	57,294
August	.....	80,650	61,995
September	.....	81,482	65,797
October	.....	86,569	67,486
November	.....	87,985	66,637
December	.....	89,590	65,558

The average daily production showed a loss last month of 995 tons, the figures for May being 90,817 tons and for April, 91,812 tons. The record average daily production was set in February, 1913, at 92,095 tons.

The merchant furnaces made the principal gain last month, the average daily production of merchant iron being 25,515 tons in May, compared with 25,426 tons in April, a gain of 89 tons. The average daily output of the steel works or non-merchant furnaces was 64,597 tons in May, and 65,519 tons in April, a loss last month of 922 tons.

In totals, the merchant furnaces produced 790,978 tons in May, compared with 762,770 tons in April, a gain of 28,208 tons. The steel works or non-merchant stacks produced 2,002,516 tons, against 1,965,575 tons in April, a gain of 36,941 tons. The merchant output was below the record set in March, 1913, with 821,333 tons, while the steel works exceeded their best previous record, established in December, 1912, at 2,000,882 tons.

Eight merchant stacks were blown out last month and one relighted, a net loss of seven. Seven non-merchant furnaces were blown out and two relighted, a net loss of five. In all, 15 were blown out and 3 blown in.

The merchant furnaces blown out were: Pioneer No. 2, of the Republic Iron & Steel Co., on May 23, for relining; Philadelphia, of the Sloss-Sheffield Steel & Iron Co., on May 18; Blanche, of the Marting Iron & Steel Co., on May 26; Macungie, of the Empire Iron & Steel Co., on May 17; Perry, of the Perry Iron Co., for relining; one Hokendauqua, of the Thomas Iron Co.; one Allen's Creek, of the Bon Air Coal & Iron Co., on May 27 for repairs, and Mayville "B", of the Northwestern Iron Co., on May 22.

MONTHLY PRODUCTION.

	1913.	1912.	1911.
January	2,787,800	2,052,806	1,766,658
February	2,578,670	2,098,796	1,781,285
March	2,762,823	2,411,529	2,165,764
April	2,754,353	2,377,621	2,044,904
May	2,815,336	2,503,341	1,871,388
June	.....	2,433,737	1,773,282
July	.....	2,402,567	1,776,108
August	.....	2,500,163	1,921,832
September	.....	2,444,454	1,973,918
October	.....	2,683,645	2,092,061
November	.....	2,639,562	1,999,100
December	.....	2,777,292	2,032,301
Totals	13,698,982	29,325,513	23,198,601

Non-merchant furnaces blown out were: South Works No. 4, of the Illinois Steel Co., on May 15; Gary No. 8, of the Indiana Steel Co., on May 17; Harriet "Y", of the Wickwire Steel Co., on May 12 for relining; one Edgar Thomson, of the Carnegie Steel Co.; one Eliza, of the Jones & Laughlin Steel Co.; one Lochiel on May 26 and Lebanon No. 3 on May 14, of the Pennsylvania Steel Co.

The merchant stack relighted was Lawrence, of the Marting Iron & Steel Co., on May 1. Non-merchant furnaces relighted were: One Shoenberger, of the American Steel & Wire Co., and one Carrie, of the Carnegie Steel Co.

The output of spiegel in May was 10,674 tons, against 9,256 tons in April, a gain of 1,418 tons. The production of ferro in May was 11,168 tons, compared with 16,752 tons in April, a loss of 5,584 tons.

Milliken Creditors Organize

Creditors of Milliken Bros., Inc., Staten Island, N. Y., iron and steel fabricators, which recently went into the hands of a receiver, met at New York, June 2, to prove claims and elect trustees. The reorganization committee filed 191 claims, aggregating $2,500,000, and claims were also filed by a number of other creditors. Francis Dykes and Forsythe Wickes, the receivers, and Lewis H. Freedman were elected trustees.

MAY PIG IRON.

States.	No. of stacks.	No. in blast last day of month. May.	Apr.	Total tonnage made. Merchant.	Non-Merchant.	——Totals—— May.	Apr.
Pennsylvania	157	116	121	208,115	935,256	1,143,371	1,179,266
Ohio	72	60	60	196,941	467,992	664,933	579,532
Alabama	45	23	25	112,530	66,673	179,203	185,256
Virginia	21	9	9	32,896	.....	32,896	33,901
New York	27	19	20	98,088	94,622	192,710	188,993
New Jersey	7	2	2	10,906	.....	10,906	10,154
Illinois	26	22	23	50,513	239,968	290,481	275,840
Colorado	6	3	3				
Indiana	10	9	10				
Maryland	4	3	3				
Wisconsin	6	4	5	29,585	173,699	203,284	199,718
Kentucky	7	1	1				
West Virginia	4	3	3				
Tennessee	18	8	9				
Washington	1	.	.	34,973	24,306	59,279	53,230
Georgia	2	.	.				
Texas	3	.	.				
Minnesota	1	1	1				
Michigan	3	2	2				
Missouri	1	.	.	16,431	.....	16,431	22,455
Spiegel—All states						10,674	9,256
Ferro—All states						11,168	16,752
Totals	421	285	297	790,978	2,002,516	2,815,336	2,754,353

President Wilson Faces a Fusilade of Questions

Fired at Him by Newspaper Men When They Are Received Twice Every Week—The Customs of Earlier Presidents

Would you like to ask President Wilson a question? If so, THE IRON TRADE REVIEW *and The Daily Iron Trade are at your service. Send the question along and it will be submitted through our Washington correspondent. During the past few years, there has been a wonderful change in the relations of business to the government. Hence there is coming a radical change in the relations of trade papers to the capital of the nation. A few years ago, trade papers had little need of a representative in Washington, except perhaps when a tariff bill was pending. But with the greatly increased supervision of business by the government, Washington has become a constant source of very important news, and* THE IRON TRADE REVIEW *and The Daily Iron Trade have taken the lead in establishing an office and employing a representative who gives all his time to their interests. Hence the readers of these papers will be closer than ever before to the president of the United States and to all the departments at Washington, for our representative will be not only a correspondent—he will be ever ready to serve in any way in his power all subscribers of the two papers. In order to show our readers how the president has opened the door to the press, our representative, L. W. Moffett, has been requested to write the following article:*

"Top o' the mornin', gentlemen."

That does not sound like the utterance of a former college professor or of a president of the United States.

But a former college professor, the president of the United States, is the one who said it.

It is the democratic greeting of a Democratic president with which newspaper men were received recently. And it is the characteristic manner in which Woodrow Wilson always receives them, and others with whom he comes in contact, when ushered into his light, airy office in the White House. Accompanying his pleasant salutation is inevitably an expansive smile.

Standing back of his swiveled chair, with his hands resting on its top, and leaning over slightly, he prepares himself for the volley of questions which he knows will be fired at him by the newspaper men. Seldom less than 20, and frequently 30 and even more members of the press are present at the semi-weekly interviews granted by the president. With the executive on one side and the newspaper men on the other, the latter surround the large, flat-topped mahogany desk, flanking themselves into a semi-circle, three and four deep.

At times the president seems to be the least bit ill at ease as the press representatives enter. But if he is, it is only for a moment. His composure is soon indicated completely. The commanding nature of a man whose business it is to maintain self-control, and who has inculcated that element in many a student, asserts itself, but not offensively.

Questions of all kinds, bearing on state, national and international matters,

(*Continued on page* 1317)

PRESIDENT WILSON AND WASHINGTON CORRESPONDENTS

The newspaper representatives with President Wilson, reading from left to right, are: Mrs. George F. Richards, Manchester Union; Rudolph Forster, assistant secretary; C. C. Brainerd, Brooklyn Eagle; Robert D. Heinl, Leslie's; James P. Howaday, Indianapolis News; David Lawrence, Associated Press; George T. Odell, New York Evening Mail; John P. Gavit, New York Evening Post; Gus J. Karger, Cincinnati Times-Star; John E. Nevin, United Press Association; Arthur B. Krock, Louisville Courier Journal; K. Foster Murray, Norfolk Virginian-Pilot; Gilson Gardner, Cincinnati Post; Thomas F. Logan, Philadelphia Inquirer; W. N. Taft, International News Service; Lee Lamar Robinson, Louisville Post; J. D. Preston, superintendent, Senate Press Gallery; C. E. Stewart, Birmingham Age Herald; Reginald Schroeder, New York Staats Zeitung; Edward B. Clark, Chicago Evening Post; W. B. Metcalf, Baltimore Evening Sun; Lynn Yeagle, Washington Post; Joseph P. Amin, Washington Herald; W. G. McMurchy, St. Paul News; L. Ames Brown, New York Sun; Henry E. Eland, Wall Street Journal; L. W. Moffett, Iron Trade Review, Daily Iron Trade; Francis J. Dyer, Los Angeles Times; Oswald F. Schuette, Chicago Inter Ocean; Mercer Vernon, Seattle Post Intelligencer; S. M. Williams, New York Evening World; John S. Shriver, Baltimore American; Leroy T. Vernon, Chicago Daily News; Joseph P. Tumulty, secretary to the president; William E. Brigham, Boston Evening Transcript; W. W. Price, Washington Star.

More Optimistic Feeling at Pittsburgh

Increased Inquiry for Pig Iron Indicates Early Buying Movement—Deadlock in Coke is Still Maintained

BY C. F. WILLIAMS

Office of THE IRON TRADE REVIEW,
2148-49 Oliver Bldg.,
Pittsburgh, June 3.

Greater optimism pervades all departments of the market, with the exception of wire and nails. Better inquiry in pig iron forecasts considerable buying at an early date. Coke remains dull with prices well maintained in this district, but little buying, as consumers are hoping to have lower quotations. Specifications continue active in finished products, but for the most part do not equal shipments.

Pig Iron.—Belief is general that the end of the present dull period in pig iron is almost reached. All signs indicate that buying must commence this week or early next week. Inquiry began this week in gratifying strength, practically 25,000 tons of basic being inquired for in this market, with a much larger tonnage in quiet and informal inquiry to feel out the market. Foundry appears to be backward and melters of this grade have not been so active. It appears the sale of basic pig iron a fortnight ago to the American Steel Foundries Co., at $14.75, valley, was made by Corrigan, McKinney & Co., Cleveland, and carried 1,000 tons a month for delivery in June and July. Two inquiries this week have encouraged sellers, one from a consumer in Pittsburgh for 1,500 tons, June delivery, and 1,000 tons basic per month for third quarter. An inquiry for 1,000 tons of foundry iron for last half comes from a radiator manufacturer east of Pittsburgh. An Ohio consumer has inquired for 2,500 tons of basic per month for the last half. Practically all tonnage for the first half will be melted by June 15 and as consumers have no reserve stock, buying before that time seems inevitable.

Ferro-Alloys.—The alloy market remains steady with no improvement from previous quotations. Ferro-manganese is still quoted at $59 to $61, seaboard.

Plates. — Little business is being done in plates, with quotations well maintained at 1.45c to 1.50c and deliveries improving each week, though still deferred three to five months.

Sheets.—The sheet market continues increasingly firm, minimum quotations on galvanized having practically disappeared, No. 28 gage being firm at 3.50c. Blue annealed is firm at 1.75c, though rumors of shading from the west are heard. Mills are from four to seven months deferred in deliveries and specifications are increasing. Cancellations are few and not more than normal.

Rails and Track Material.—Specifications continue steady on both standard and light sections. Railways are ordering now for emergency work in small lots beyond their purchases at the beginning of the year. Foreign orders continue in good volume and with crop expectations and the probable increase in freight rates, large buying is expected in the late summer. In some quarters, business is near the record of last year.

Billets and Sheet Bars.—No change has occurred in the price of billets and sheet bars. Mills being sold so far ahead, orders are few, as delivery is too greatly deferred. Specifications continue in good volume, but the mills gradually are getting closer to the consumer. The leading interest was able to operate its sheet mills only 50 or 60 per cent capacity part of last week owing to lack of steel. Indications are that conditions will be better this week. Sheet bar producers seeking to buy in the market are unable to obtain prompt tonnage for their sheet mills.

Hoops and Bands. — Business in this department continues firm, specifications against contracts being at an average for this season. Mills are able to catch up somewhat on their bookings, but are still several months behind in deliveries. Cotton ties are being rolled but no price has been set as yet.

Iron and Steel Bars.—This market is firm, iron bars at 1.40c and steel at 1.70c. Shafting presents no change from last week.

Muck Bar.—Quotations of $31 and $32, Pittsburgh, on muck bar continues to represent the market fairly.

Bolts, Nuts and Rivets.—Established prices on rivets are being shaded about $2 a ton. Rumors of further shading have been traced to one small manufacturer, but do not affect the general market. Structural rivets are selling at about 2.10c and boiler rivets about 2.20c.

Structural Shapes. — The market for structural shapes is quiet but firm. Practically all the new business is confined to small orders on which quicker deliveries are made and which are appreciated by the mills as easier to handle. Deliveries are somewhat quicker and premiums for prompt material have practically disappeared. Fabricators are kept busy largely with small orders. Shapes are quoted at 1.45c to 1.50c.

Iron and Steel Pipe.—Following the advance of last week on standard steel and line pipe, the National Tube Co., May 29, advanced water well casing $2 to $4 a ton. These advances indicate strength of the market and have been adopted generally. A general advance of oil country goods corresponding to the previous advance on standard, effective June 2, has been announced by the National Tube Co. Standard weight iron pipe has also been advanced $1 per ton.

Boiler Tubes.—An advance of $2 a ton on sizes from 3 inches to 4½ inches, effective May 29, has been announced.

Wire Products.—The wire market is extremely weak and there is practically no buying. Market prices are held, but a decline seems near. Recent prices have not been established and lethargy is seen in specifying and buying, most jobbers being well stocked. Shading of $1 to $2 a ton is being done. Readjustment is expected soon, probably during July, when contracts for second half and the full year usually are made.

Coke. — The dead-lock on coke continues unbroken, quotations of $2.35 and $2.40 on furnace coke being rejected by inquirers. Rumors of sales in Philadelphia at $2 and at Buffalo at $2.10 have a tendency to prevent buying at the prevailing quotations. Foundry coke continues strong and sales are rumored at $3.25. The Connellsville *Courier* for the week ending May 24 reports production of coke at 396,904 tons, as against 409,428 for the preceding week.

Old Material.—An unusual supply of railroad and other scrap this spring has tended to weakness in this market. Melters have been consuming their normal quantity, but the demand has not kept pace with the accumulation. Heavy melting steel continues at $13 to $13.25, though some selected tonnage is bringing $13.50. However, the latter is so small as to have no appreciable effect on the market.

New Business Still Light at Chicago

Mills Operating to Capacity—Weakness of Southern Iron Causes Melters to Hesitate About Placing Orders

BY E. R. BOYER

Office of THE IRON TRADE REVIEW,
1521-23 Lytton Bldg.,
Chicago, June 3.

The trade in the west has appeared to be somewhat optimistic for the past ten days, but this spirit has not resulted in renewed business activity. Consumers appear to be anxious to make certain of deliveries on the tonnage for which they are already contracted, as specifications during the past week have shown a decided improvement. New business, however, continues to be very light and during May fell considerably below the April average. While the mills are still operating at capacity, their shipments are now much greater than their new bookings and deliveries are better. In plates, shapes and bars, however, assured business runs well into the fourth quarter and producers are not exercised regarding the immediate future. There is no renewed strength apparent in the market for sheets and owing to the lack of demand wire products are softer.

Pig Iron.—Inactivity still characterizes the pig iron market and in view of lower prices on southern iron, many consumers are even less disposed to cover for future requirements. Both sales and inquiries are confined to small tonnages for immediate delivery. Prices on southern iron range from $11 to $12, Birmingham, but the present market appears to be in the neighborhood of $11.25, as no material transactions on the $11.00 basis have been reported. On northern iron, the furnaces do not appear willing to quote lower than $16.00, furnace, but are unable to obtain business at that figure in view of prevailing Birmingham prices.

Under present conditions, quotations must be considered as nominal, as no tonnages of sufficient size to test the market have come out. It has been thoroughly demonstrated that lower prices do not encourage buying and that consumers are disposed to await rock bottom prices. It is reasonably certain, however, that further reductions in the price of southern iron will cause many stacks to be blown out, which will check further declines. With this condition imminent, much depends upon the future rate of consumption, as a good melt coupled with a marked decrease in production would likely cause a reaction in price.

Merchant Bars.—Complete figures on business in this material during May are not available yet, but it is known that there has been a considerable reduction in new offerings. Specifications for both iron and steel are being maintained at a fair rate, but are not equal to shipments. This is particularly true of bar iron. The usual quotation on the latter for Chicago delivery is 1.55c, but in competition outside the city 1.50c is openly quoted and probably 1.45c would be on desirable business.

Plates and Structurals.—As was the case in merchant bars, new business in plates and shapes booked by the mills during May showed a marked decrease from the April average. Some mills, however, are booked up into the fourth quarter, and one eastern producer selling in this territory reports specifications up to the first of next year. Accordingly, mill operation is still at capacity and prices show no indication of falling off. Specifications for both plates and shapes are being received in very satisfactory numbers, but the tonnage is somewhat below shipments. Store business is active and prices are firm and unchanged. Railroad requirements continue small, although some business is pending.

Rails and Track Fastenings. — Specifications for rails continue heavy and the growing spirit of optimism which has been apparent for some days may result in a resumption of more or less active buying. New business in both rails and track fastenings, however, is very light, but one recent order being noted. This involves 7,000 tons of rails ordered from the Illinois Steel Co. by the Kansas City Southern. Business in track fastenings is negligible, but specifications are well maintained. Prices are unchanged and no further weakness in spikes has developed.

Bolts, Nuts and Rivets. — The market for structural rivets is no better, and this weakness has extended to bolts and nuts. For the immediate present, production is in excess of new demand, and there is less complaint regarding deliveries.

Sheets. — The weakness in the sheet market is still concentrated on galvanized, as the demand for black sheets is considerably better than for the former. Considering the weakness of spelter, however, prices on galvanized sheets are satisfactory to producers. Makers in this territory are restrained from keen competition for new business by the necessity of protecting prices on tonnage previously booked.

Wire Products. — Although there is a noticeable lack of demand for wire products at present, producers feel that there is good reason to expect an improvement in the near future. Although rumors of lower prices are heard, quotations are holding up well.

Cast Iron Pipe. — Inquiries and specifications for small lots are liberal, but no new sizable tonnages have come out. The requirements of Bloomington, Ill., consisting of about 700 tons, are still pending. Prices are unchanged on a basis of $28 for 4-inch water pipe.

Old Material. — Scrap prices in this district must be regarded as nominal, as there are hardly enough transactions to afford a fair basis on which to quote. Such deals as have been made have been confined to very few items on the list. Following the reductions noted last week, no further declines have been made as most dealers feel that it is useless to quote prices under present conditions. Consumers continue to take on only enough scrap to keep their stocks up and thus avoid enforced activity in the future which would result in higher prices. The present market is decidedly favorable to those dealers who are short, as they are having no trouble in covering at a good profit.

Chicago Foundrymen's Dinner

Chicago, June 2.—A special program has been arranged for the beefsteak dinner of the Chicago Foundrymen's Club, which will be held at the Stock Yards Inn, Saturday evening, June 7. Among other things, the Foundrymen's Choral Society will make its first appearance. The local committee for the October convention, of which Charles A. Plamondon, of the A. Plamondon Mfg. Co., is chairman, will attend the dinner.

Will Consider Structural Rate

Washington, June 2.—The proposed rate of from 1½ cents to 2½ cents per 100 pounds on fabricating steel in transit in Central Freight Association territory will be taken up at a hearing of the Interstate Commerce Commission June 18. The new tariffs were filed to become effective May 15, but were suspended until Sept. 12 by order of the commission. The territory embraces points east of the Mississippi river to Buffalo and Pittsburgh on the north and north of the Ohio river.

Greatest May Ore Shipments on Record

In Spite of Bad Weather, Fleet Moves Tremendous Tonnage—Pig Iron Market Dull in Cleveland

BY GEORGE SMART

Office of THE IRON TRADE REVIEW,
Penton Bldg.,
Cleveland, June 3.

Iron Ore.—The movement of ore for May exceeded all estimates and made a new record for that month. The shipments were 7,284,212 tons, compared with 5,919,074 tons in May, 1912, and 3,684,819 tons in May, 1911. The remarkable showing for last month was made in spite of trouble due to ice and heavy rains. At the May rate, it will be easy to move 50,000,000 tons during the season. Another illustration of the capacity of handling ore is furnished by the way in which vessels have been unloaded since Memorial Day. In spite of the general expectation of congestion at lower lake docks, none has occurred. This was due in part to the fact that delays caused by the thick weather in the rivers reduced the number of arrivals Sunday and Monday. There is at present an ample supply of vessel tonnage at both ends of the route. The option which one shipper took on 50,000 tons of ore at an advance of 5 cents per ton will not be exercised, as wild tonnage can be had at contract rates. The shipments by ports for May were as follows:

Port.	May, 1911.	May, 1912.	May, 1913.
Escanaba	436,008	712,359	738,158
Marquette	204,093	356,914	489,547
Ashland	226,528	513,484	681,460
Superior	1,239,153	1,931,307	2,047,396
Duluth	896,113	1,276,027	1,939,848
Two Harbors..	682,924	1,128,983	1,387,803
	3,684,819	5,919,074	7,284,212
1913 increase over 1912....			1,365,138

Port.	1911. To June 1,	1912. To June 1,	1913. To June 1.
Escanaba	529,540	792,889	955,187
Marquette	218,931	356,914	527,041
Ashland	267,865	521,772	734,941
Superior	1,315,892	1,995,723	2,300,271
Duluth	947.155	1,294,264	2,100,220
Two Harbors .	737,081	1,161,554	1,532,939
	4,016,464	6,123,116	8,150,599
1913 increase over 1912 ...			2,027,483

An inquiry has been received for 60,000 tons of ore for export in 1914. The exporting firm stipulates that the ore shall contain 60 per cent iron, 0.03 phosphorus, 4 per cent silicon, and be free from copper, arsenic and all injurious substances. This inquiry is similar to inquiries recently received in New York. It has not aroused much interest among Lake Superior sellers.

Pig Iron.—In the immediate Cleveland district, the market is extremely dull, while some Cleveland agencies report increased demand and fair sales at other points. Some iron has been sold for delivery in the east. On the whole, the outlook is considered more favorable. A sale of 800 tons of southern iron was made for Cleveland delivery during last half at a little less than $11.50, Birmingham, for No. 2. An inquiry for 1,000 tons of southern iron is pending.

Coke.—Prices on coke are being well maintained for both foundry and furnace grades, but very little business is being transacted.

Finished Materials. — Specifications continue to be liberal and sellers are taking material on contracts as fast as they can get it, but new business is still very limited, and on some of the lighter lines, there is considerable cutting. The rivet market has developed considerable weakness, but the extremely low quotations recently made have been confined to one or two unimportant makers and quotations are fairly well maintained by the larger interests. Quotations on shafting are irregular in spite of good demand. Eastern mills are no longer endeavoring to obtain premiums on plates and shapes and are taking a fair amount of business on the basis of the prevailing Pittsburgh prices. Warehouse business continues heavy. The price of oil country pipe has advanced $1. There is good inquiry for line pipe and one sale of 160 tons has been made. Merchant pipe is in better demand than for some time.

Old Materials. — Further weakness was manifest in the scrap market during the week. Quotations are lower on nearly all varieties of scrap. Heavy melting steel is now taken at $11.50 to $12. Very little business is being done, except for immediate needs. The Lake Shore closes a list on June 6, and the Baltimore & Ohio on June 7. There is a quantity of old bridge material on the market, due to the recent floods. However, this scrap must be cut by hand, and with the present weakness in heavy steel the added cost of $3 to $3.50 a ton makes handling it unprofitable.

N. F. S. Russell has been made general purchasing agent of the United States Cast Iron Pipe & Foundry Co., effective June 1, with headquarters at Burlington, N. J. Heretofore Mr. Russell has been purchasing agent for only the eastern plants of the company.

BUFFALO INQUIRY

For Pig Iron Has Increased—Low Prices on Malleable.

BY FRANK R. DOLBEE

Office of THE IRON TRADE REVIEW,
Buffalo, June 3.

Pig Iron.—The placement for the week totaled about 5,000 tons, leaving an inquiry aggregating between 8,000 and 10,000 tons still under negotiation. This makes the outlook a little brighter than it has been for some time and the evidence of an increasing interest on the part of the melters. About 1,500 tons of foundry grades was purchased for the Brooks plant of the American Locomotive Works, at Dunkirk, N. Y. Prices have softened slightly in the past week. The range on No. 1 foundry of $15 to $15.50 and the schedule on the other grades is merely nominal, for some stacks are holding out for the maximum quoted, while inquiries for tonnages are being considered by other interests at figures slightly below the range given in the prices quoted. One sale of No. 3 foundry was made at $14.25, but the ruling price of the furnaces is so far $14.50. There was no trading in gray forge so the price of $14.50 quoted is but approximtae. Malleable for eastern shipment can be bought at $14.75, Buffalo furnace, and possibly at $14.50. There is a fair inquiry for malleable, including one for 2,000 tons from a Trenton company.

Finished Material. — Several mill agencies have followed up inquiries which have developed in the past few weeks and find that they are based upon actual requirement for current and immediate future consumption. Users that have been purchasing from warehouses are seeking to have their needs supplied by the mills. Reports indicate that the steel being shipped out in shapes, plates and bars, etc., is being used as rapidly as it is being received. A slightly better feeling among the buyers has been noticeable in the past week. A number of interests here seem to feel that a buying movement is likely to occur late in July or begin early in August.

Prices quoted by the mills remain the same, but in some instances the warehouses have softened the premiums exacted for prompt deliveries.

Old Material.—The scrap market remains inactive with a consequent falling off in the prices on old car wheels, and railroad wrought and machine cast scrap.

In 1912 Swedish iron exports were 5,522,746 metric tons, against 5,106,764 tons in 1911.

Revival of Iron Inquiry in Philadelphia

Predicted Heavy Contracting Will Soon Begin—Plate Makers Resist Efforts of Buyers to Shade 1.60c, Pittsburgh

BY C. J. STARK

Office of THE IRON TRADE REVIEW,
611 Bulletin Bldg.,
Philadelphia, June 3.

The principal development in the eastern Pennsylvania market has been the revival of pig iron inquiry. About 30,000 tons is out and it is believed by sellers that the persistent decline in prices is about to be halted. New finished tonnage is not increasing and order books are being reduced. Scrap continues weak.

Pig Iron. — With the approach of midyear, beyond which there is apparently much unfilled requirement, many pig iron buyers seem to have concluded that the time is ripe for re-entering the market. Inquiries have been put forth for a record tonnage. It is predicted that the next week or ten days will see the heaviest contracting in weeks. The Pennsylvania railroad asks 4,550 to 9,100 tons for third quarter Altoona shipment divided into 1,600 to 3,200 tons of No. 2X, 1,800 to 3,600 tons of No. 4, 650 to 1,300 tons of Lake Superior, and 500 to 1,000 tons of southern charcoal iron. The Baldwin Locomotive Works is out for 1,000 to 4,000 tons of prompt low silicon foundry. A railway equipment maker wants 1,000 to 2,000 tons of foundry iron for last half. A Trenton consumer asking for 500 tons of No. 2 plain for third quarter is expected to buy 1,500 to 2,000 tons, and reports having been offered southern iron at $15.50, delivered. Northern No. 2X remains about $16.50 to $16.75, Philadelphia, but further shading is not improbable. Virginia iron is freely offered at $14, furnace, for No. 2X, $13.75 for No. 2 plain and $13.50 for lower grades. Pipe makers are more active. One of them is considering the purchase of 10,000 to 15,000 tons of No. 2 plain and forge. Another has bought 3,500 to 4,000 tons additional, northern and southern. Northern pipe iron is quoted around $15.50, delivered. Basic is nominal at $16.50, delivered. Standard low phosphorus iron is quoted at $23.25 to $23.50, Philadelphia, depending upon the phosphorus. Recent purchases include 3,000 tons by an eastern Pennsylvania steel maker and 3,000 tons by an eastern steel foundry, the latter largely Lebanon low phosphorus, at $19, furnace. Another buyer took 1,000 tons of Lebanon iron. A Trenton consumer asks 2,000 tons of malleable and has been quoted $17.30, delivered.

Iron and Steel Bars. — One western Pennsylvania independent maker is offering steel bars in the east for delivery in three to four weeks. Usually the mills promise nothing under eight to ten weeks. New business is light. Specifications are still good. Prices hold at 1.40c, Pittsburgh. Bar iron remains weak at 1.50c, eastern mill, with new business moderate.

Plates.—Eastern Pennsylvania plate makers continue to resist the efforts of buyers to shade their schedule of 1.60c, Pittsburgh. Some further contracts to the end of the year have been booked on this basis or 1.75c, Philadelphia. Plates for three weeks have also sold at this price. New tonnage is of miscellaneous character and of fair volume, but order books are slightly being reduced. From 8,000 to 10,000 tons of ship plates are pending.

Structural Material.—Smaller sized orders generally make up the new eastern structural business. New fabricating offers are light, but 6,000 to 7,000 tons of railroad bridge work is still pending. Eastern mills are getting a little better tonnage in the heavier sections where the orders have been light. Their prices range from 1.45c to 1.50c for large and small lots.

Sheets—Miscellaneous orders and liberal specifications continue to enable eastern mills to run to capacity. Consumers invariably want quick shipment. Prices are firm at 1.90c, Philadelphia, for No. 10 gage blue annealed.

Semi-Fnished Steel.—Eastern buyers have put out some heavy inquiries for third quarter and last half billets. Sales are moderate and specifications good. Prices show strength.

Old Material.—One eastern Pennsylvania steel maker has purchased 6,000 tons of heavy melting steel at $12, delivered. This represents the consuming market, but merchants are reluctant to sell freely upon this basis, fearing their inability to cover at so low a figure. Buying is on a low scale and forced sales are still bringing new low prices in some grades.

Southern Iron Weak at Birmingham

While Prices Continue to Sag—Shipments Fairly Satisfactory, But Stocks Are Still Increasing

BY W. B. NEAL

Office of THE IRON TRADE REVIEW,
Birmingham, Ala., June 3.

Pig Iron.—Despite the efforts of all the producing interests to maintain selling prices at figures of $12 per ton, Birmingham, for No. 2 foundry, for southern delivery, a decline of at least 50c per ton from such figures has been suffered. With the decline in price, the volume of inquiry has probably increased, but the consuming interests are no more disposed to provide for future requirements. In the past week, an aggregate of some 7,000 tons was reported sold. Of this, the largest single consideration was a lot of 1,000 tons of analysis iron which was being negotiated at the time of last report. Aside from this, 100-ton lots for prompt delivery were principally in demand, with several 500-ton lots from different quarters of the trade. From the most reliable information obtainable, the bulk of the tonnage engaged for requirement in Southern territory brought about $11.50 per ton at Birmingham for No. 2 foundry. For the tonnage sold in competitive territory, it is not believed that higher figures than $11.25 per ton at Birmingham were received.

The output has just been reduced by the blowing out of one stack for relining, but so far as is known at this time, no further reduction will be made in the make during the month of June. The rate of forwardings from furnace yards was fairly satisfactory all through the month of May, and the specifications received so far for June are liberal; however, the aggregate stock accumulation has been substantially increased.

Old Material.—In the absence of trading this market cannot be reported intelligently. The schedule of prices is no doubt even lower than as last revised—at the same time, no tonnage to speak of is being sold.

Pig Iron Weak in Cincinnati Market

But Southern Ohio Makers Are Resisting Further Decline—Inquiries Are Few—Alabama Quotations Sag

BY S. J. BACKMAN

Office of THE IRON TRADE REVIEW,
503 Mercantile Library Bldg.,
Cincinnati, June 3.

Pig Iron.—The market is still very dull and comparatively weak. Quotations on southern No. 2 foundry iron are a little below those of last week, and $11, Birmingham basis, is now the most general minimum price on this grade for any delivery through the year. A few furnaces in both Tennessee and Alabama are still holding at $12, Birmingham, but are not making any sales at this figure. Probably the majority are on an $11.25, Birmingham basis, but iron at $11 can be obtained from stacks in both states, also. As is generally the case with a market of this kind, there are always rumors of iron that is being offered below the general minimum prices. It is reported that one and perhaps two furnaces are offering No. 3 foundry at $10.25, Birmingham, and No. 2 foundry at $10.75, but as yet it is not definitely known that any sales have been made at these figures.

The southern Ohio situation is unchanged as far as outside appearances are concerned, and if furnaces in that district are selling either basic or No. 2 foundry iron below $15, Ironton, it is not generally known. Ohio iron at this price is too high when compared with southern iron, but furnaces thus far have refused to concede anything lower. The Nally furnace of the Marting Iron & Steel Co., at Ironton, has blown out for relining, and the two stacks at Ashland, Ky., are now in blast.

Inquiries are very few, and the majority of sales being made at present are being secured secretly by salesmen. In most cases, attractive offers are necessary to induce the melters to buy. There is an inquiry in the market from central Indiana for about 1,000 tons of either northern or southern iron for the last half.

Coke.—There have been some slight reductions in the prices of certain makes of coke within the past week. The maximum price of New River foundry for both spot and contract deliveries is now $3.50 per ton, ovens, and some Wise county 72-hour makes can be had as low as $2.60, ovens. Pocahontas prices are the same, but Connellsville foundry is given at from $2.75 to $3 for prompt, and $2.85 to $3.25, for contract shipment. The minimum price for Connellsville and Wise county furnace coke is now $2.15, ovens. The deadlock between the furnaces and ovens is still on, and each refuses to concede to the other's demands. Quite a little foundry coke is being sold, the majority of which is renewal of contracts, but some new business is also being closed.

Finished Material. — Conditions in the sheet market here are a little better. The situation looks a little stronger and specifications are coming in better than for some time. The local mill is now from five to six weeks behind on deliveries whereas a couple of weeks ago it was only four weeks behind. Prices are firm at 3.40c for galvanized sheets and 2.35c for black sheets, both No. 28 gage, Pittsburgh basis.

Warehouse business continues fair, and the prospects are a little more encouraging. Some of the warehouses here report active business during the past week and several good inquiries on hand. Prices are the same with the exception of those on boiler tubes, which have been advanced as follows: 1¾-inch and 2-inch, 55 off; 2¼-inch, 52 off; 2½-inch, 58 off; 3-inch, 63 off; 3½-inch and 4-inch, 66 off; and 5-inch and 6-inch, 58 off.

Old Material.—There has been no change in the scrap iron market during the past week but the situation shows a tendency to become weaker unless unlooked for conditions develop soon that would have a strengthening effect upon prices. This would be in the nature of a better demand for the important grades carried by dealers here and also such as a betterment of the pig iron market. Sales during the past week have been very few and dealers have likewise added very little to their stocks. Foundries are not buying much scrap iron and the rolling mills in this section are also not taking as much as has been their custom. Mixed cast has probably been the best seller of the past week, with quotations ranging from $8.50 to $9 per net ton.

METAL MARKETS

New York

June 3.

Copper.—The prospective further decrease in domestic surplus copper stocks and offerings by some producers and second hands at concessions from the quotations of large producers has failed to attract buyers. Business during the past week was light and the course of prices downward. Electrolytic is offered in fair size lots at 15.50c cash, New York, by some sellers, while lake can be had at 15.62½c. The leading sellers are quoting 15.87½c, delivered 30 days, for electro, and 16c for lake, but these figures are nominal, and what business there is is going to the cheaper sellers.

Exports in May aggregate 38,251 tons. Notwithstanding the heavy shipments to Europe during the first five months of this year, foreign stocks continue to decline. The fortnightly statistics at the end of May show that 61,000 tons of copper were delivered to consumers during the past month, and fresh supplies amounted to only 57,380 tons. Standard copper closed in London today at £67 2s 6d for spot and £67 for three months.

Tin. — The London price of spot tin reached £210 today under heavy sales by speculative operators. This is a decline of £21 from the highest price of May. The local market has fully reflected the decline abroad, and consumers have profited by the lower prices and bought considerable metal during the past two days at between 46.50c and 47.50c for spot and June to domestic consumers.

Deliveries in May amounted to 3,350 tons, and arrivals for the same period were 3,022 tons.

Spot tin closed in London at £212 and three months at £209 15s.

Lead. — Demand is not as good as it was last week and prices are a shade lower. Shipments to this territory are offered at from 4.32½c to 4.35c.

Spelter.—Offerings of spelter in the face of little demand has forced the price down to 5.35c in New York.

Chicago

June 3.

New Metals.—The market for new metals is decidedly dull and prices are soft accordingly.

Lake copper, carload lots, 15⅝c; casting, 15¾c; smaller lots, ¼c to ⅜c higher. Spelter, car lots, 5.35c; lead, desilverized, 4.25c; sheet zinc, $7.75, f. o. b. La Salle, in car lots of 600 pound casks; pig tin, 48.57c; Cookson's antimony, 8⅞c, other grades, 7⅝c.

Old Metals.—Conditions in this market are approaching those in the market for iron and steel scrap but corresponding declines have not materialized as larger dealers are making no quotations except when actual business is involved. Transactions, however, are few, and do not furnish a basis for quoting prices. Accordingly our prices as given below are nominal.

Copper wire, crucible shapes, 15¼c; copper bottoms, 12½c; heavy red brass, 12½c; heavy yellow brass, 10c; No. 1 red brass borings, 11½c; No. 1 yellow brass borings, 8¼c; brass clippings, 10c; lead pipe, 3 9-10c; zinc scrap, 4¼c; tea lead, 3⅝c; N. 1 aluminum, 19c; No. 1 pewter, 36c; block tin pipe, 46c; tin foil, 42c; linotype dross, 3¼c; electrotype dross, 3¼c; stereotype plates, 4⅝c; stereotype dross, 4¼c.

Decided Buying Increase in New York

In Pig Iron Market and Numerous Inquiries Are Still Pending—Buffalo Prices Dominate the Situation

BY C. J. STARK

Office of THE IRON TRADE REVIEW,
503-04 West Street Bldg.,
New York, June 3.

Iron Ore.—Owing to the longshoremen's strike at Philadelphia, the Bethlehem Steel Co. has been discharging some Cuban ore at Perth Amboy, N. J., which is conveniently located for inland haul to South Bethlehem. The Philadelphia strike situation is improving and ore unloading is going forward more normally, especially at the Girard Point docks. Ore selling is light.

Pig Iron. — A marked increase in buying and inquiry has featured the metropolitan pig iron market the past week. Sales reached 20,000 to 25,000 tons, at least. The Warren Foundry & Machine Co., Phillipsburg, N. J., divided 8,000 to 10,000 tons of No. 2 plain and forge iron for third quarter among several furnaces at an average of $15.50, delivered, or less. The American Locomotive Co. bought 3,000 tons of No. 2 plain from a Buffalo maker for Dunkirk, 1,500 tons from an eastern New York state furnace for Schenectady, 1,000 tons for Richmond from a Virginia furnace, and 400 tons of mixed foundry grades for Pittsburgh from a nearby interest, or 6,000 tons in all, for third quarter. The Dunkirk and Schenectady business was done on the basis of $14.50, Buffalo, for No. 2X. Scattered sales have been better. Inquiries include 5,000 to 7,000 tons of foundry iron for a local buyer for outside delivery; 1,000 to 2,000 tons of charcoal and malleable for a New York state railroad specialty manufacturer; 1,000 tons of malleable for a Connecticut shop; 2,000 tons of various foundry grades for a maker of railway equipment, principally for southern delivery, and others. Prices remain soft. Buffalo iron, offered at $14.50, furnace, for No. 2X, or $16.25, tidewater, this district, and $16.95, New England, apparently dominates the situation. Other makers are being forced to meet this price in competitive business.

Ferro-Alloys.—The ferro manganese market is at a standstill, probably due to uncertainty over the tariff. It is indicated that the inside of the market at present is probably not below $60.00, seaboard.

Plates.—The past week has seen no awards of consequence in cars. New inquiries of this character are few. New plate tonnage is of only moderate extent and is made up of miscellaneous lots. Eastern Pennsylvania makers still decline to shade 1.60c, Pittsburgh, or 1.76c, New York, their regular schedule. Some contracting to year end at this price is being done. It is reported that one western Pennsylvania maker is offering plates much more promptly than the larger makers usually do.

Structural Material. — New business in structural shapes is of lighter volume. Dearer money seems to be holding back New York building work, especially in lofts and apartments. Eastern mills now are able to ship most sizes except the smallest, in four to five weeks, at 1.45c, Pittsburgh, and are gradually cutting order books. Fabricating competition remains keen.

Iron and Steel Bars. — Reports of prompt steel bars offered by one independent maker at 1.40c, Pittsburgh, refer to a limited tonnage of Bessemer steel sought to fill up a new mill. These offers are now less in evidence. The pressure for shipment seems as heavy as ever and some buyers are still paying premiums for quick delivery. Two or three smaller mills are aggressively competing for bar iron business and quoting down to 1.45c, New York. Other eastern makers ask around 1.60c, New York.

Cast Iron Pipe.—Eastern pipe makers are again hearing of the heavy requirements for a water line for Buenos Aires, bids for which will be asked soon. This work will require 100,000 tons of 60-inch, either riveted or cast pipe. Export inquiries are numerous, including 4,000 tons of 4's to 14, for Cairebean, Cuba, and 3,000 tons of 4 to 24-inch for Santiago; 2,000 tons for Porto Rico and 1,000 tons for Chile. The contract for the high pressure line, New York City, has not yet been awarded to the low bidder, J. J. Mulcahy, and it is not certain that it will be at last reports. If the award goes through, the Warren Foundry & Machine Co. will furnish the 10,000 tons required. Schenectady, N. Y., asks revised bids on 1,500 tons of 24-inch. New business is better and some makers are encouraged to hold more firmly prices which have been irregular.

Old Material. — The market has dropped so that holders of scrap are reluctant to let it go and dealers are cautious in selling short. New business is slow. Sales noted include 500 tons of heavy steel at $12.00, delivered, and a small lot of borings at $8.50, delivered, both eastern Pennsylvania. Yard wrought sales under $11.50, Jersey City, are reported.

Wire Not Reduced

New York, June 4. (By wire.)—A current report that wire has been reduced $1 is denied by leading producers. The American Steel & Wire Co. continues to quote 1.80c on nails and 1.60c on wire to jobbers. Business is reported normal for this season.

New Commissioner

Joseph E. Davies, who is now commissioner of corporations, was educated at the University of Wisconsin.

JOSEPH E. DAVIES

Since 1901, he has practiced law, serving four years as district attorney, and is a recognized authority on corporation law. He became chairman of the Wisconsin state executive committee and also Democratic national committeeman. He is now secretary of the national committee.

The effects of the Globe Machine Co., of Louisville, Ky., which recently became bankrupt, were disposed of at public auction, May 22, by A. R. Cooper, trustee in bankruptcy. The machine tools, transmission equipment and other property of the concern were purchased by George F. Breitenstein, Louisville, who operates a machine shop.

BUFFALO STRIKE FAILS

In Numerous Plants—Union is Not Recognized.

Buffalo, June 3.—The fight of the striking machinists for the union shop as against the open shop, the 50-hour week against the 54-hour week, and the minimum wage scale in place of the piece and premium work, has dwindled down to but five out of a score of large and small shops, and from over 3,000 employes to less than 4$$. As stated in THE IRON TRADE REVIEW for May 29, Buffalo was picked as a place to test the strength of the International Machinists' Association. According to the members of the Employers' Association of Buffalo, the strike has failed all along the line.

"The men have returned to all of the shops involved except the Buffalo Gasolene Motor Co., the Sterling Engine Co., the Olin Gas Engine Co., the Contractors' Plant Mfg. Co., and the D. H. Stoll Co.," said William H. Barr, president of the Employers' Association, and general manager of the Lumen Bearings Co.

"In every instance, the men have returned not as union men, but as individuals, agreeing to go back to work under the conditions which existed at the time they went on strike and to leave their differences to be adjusted as a matter between employer and employe. None of the members of this association yielded a single point. We insisted that our plants would be run as open shops and the men who have returned have agreed to the maintenance of this cardinal condition of employment."

John E. Gorss, secretary of the Employers' Association, said there were about 400 men still out in the plants enumerated above. "While no effort was made up to a week ago to bring men here to take the place of the strikers," said Mr. Gorss, "a different course has since been pursued. We now have men on the way here to fill every position in these shops where the machinists and helpers, etc., are still out, and the shops will be in full operation by the end of the week.

"Not a single shop has treated with union officials. The only meetings, prior to the return of the men have been between the men themselves as employes and their employers. None have agreed to the 50-hour week, or the minimum wage.

"An instance of the way in which the machinists' strike has broken up is the way the employes of the Niagara Machine & Tool Works returned. Saturday the men had a meeting. Ninety-one voted to return and 15 to stay out on strike. Monday morning 103 of the men returned to their old jobs under the exact conditions which existed at the time they left several weeks ago.

"This association has affiliated with it as members 75 per cent of the employing teamsters. A strike of the teamsters has been threatened for some time and at last report was postponed until June 7. In the meantime, the strike of the drivers of the express companies has failed, the union of the drivers disbanded and its charter returned. This collapse will probably put an end to the teamsters' strike, instead of having the latter bolster up the strike of the machinists now at the end of the rope.

"It was stated at the beginning of the machinists' strike in the middle of May, that the Pierce-Arrow Motor Co., had decided not to let its men strike but to recognize the union and grant all of their demands. As a matter of fact, the men of the Pierce-Arrow plant refused to go on strike, expressing complete satisfaction with the wages, hours and working conditions found there."

Great Day

In a Texas Town—A Tale of Results of Wilson's Election.

(*Waxahachie, Tex., Enterprise.*)

Last Saturday was a great day in Waxahachie. Hankey, the great iron buyer, who since Wilson was elected ships his iron across the ocean to Italy, was in Waxahachie buying iron. Hankey bought more iron Saturday than was ever bought in Waxahachie in any one day. Great loads of old iron were hauled, as far as thirty or forty miles. Some loads of iron and brass brought from $15 *to* $45 *per load.*

For the benefit of those who are living so far that they could not deliver all their iron in one day, Hankey will be in Waxahachie again Saturday, May 31, *to buy old iron, bones and metals. Hankey will on that great day pay more for old iron than any local dealer in Waxahachie. He wants to buy four big carloads on that one day.*

Since Wilson's election iron in Italy is very high. Iron may never be as high as it is now. Haul in your iron and call at the H. & T. C. freight office for Hankey, the great iron buyer.

GREATEST PRODUCTION

Of Plates and Sheets, Tin Plates and Terne Plates Last Year.

The Bureau of Statistics of the American Iron and Steel Institute has received from the manufacturers, statistics of the production of iron and steel plates and sheets, black plates, or sheets, for tinning, and tinplates and terne plates in the United States in 1912. For 1911 and previous years the statistics were compiled by the American Iron and Steel Association.

The production of iron and steel plates and sheets in 1912, excluding nail plate and skelp, amounted to 5,875,080 tons, against 4,488,049 tons in 1911, an increase of 1,387,031 tons, or over 30.9 per cent. The maximum production was reached in 1912. The year of next largest production was 1910. The production of nail plate and skelp will be given later.

The production of black plates, or sheets, for tinning in 1912, amounted to 982,197 gross tons, against 795,598 tons in 1911, an increase of 186,599 tons, or over 23.4 per cent.

The production in 1912 was much the largest in our histroy. The year of next largest production was 1911.

In 1912 there were 34 active black plate works, as compared with 31 in 1911, 35 in 1910, 31 in 1909, 28 in 1908, and 31 in 1907. In 1912 there were 3 idle works, as compared with 4 in 1911, 4 in 1910, 9 in 1909, 13 in 1908, and 10 in 1907. Two black plate plants were being built in Ohio at the close of 1912.

From reports received from the large producers and from estimates made for a few other makers the bureau finds that the production of tinplates and terne plates in 1912, amounted to about 2,157,055,000 pounds, or 962,971 gross tons, as compared with about 1,756,070,000 pounds, or 783,960 tons, in 1911, an increase of 400,985,000 pounds, or 179,011 tons. Of the total in 1912, 1,965,659,000 pounds, or 877,526 tons, were tinplates, as compared with 1,597,629,000 pounds, or 713,227 tons, in 1911, an increase of 368,030,000 pounds, or 164,299 tons, and 191,396,000 pounds, or 85,455 tons, were terne plates, as compared with 158,441,000 pounds, or 70,733 tons, in 1911, an increase of 32,955,000 pounds, or 14,712 tons. The combined production of tinplates and terne plates in 1912 was much larger than in any other year.

In 1911, our production of tinplates and terne plates first exceeded our consumption, the difference amounting to 47,282 tons.

No Price Agreements Made at the Gary Dinners

Judge E. H. Gary Explained the Purpose of These Gatherings and the Good They Accomplished—The Price of Rails and How the Business is Placed

At Tuesday's hearing of the United States Steel Corporation dissolution suit, held in New York, Judge E. H. Gary's testimony related largely to the policy of fixing and announcing prices. He denied emphatically that he ever was a party to price agreements with other manufacturers and stated that the contention of the government that the so-called "Gary dinners" were merely a means to bring about iron and steel price agreements, was absolutely unjustified. The object of these dinners, he said, was to promote stability of business and friendly competition on the part of various iron and steel manufacturers, and he asserted that he could see nothing illegal in exhorting manufacturers to do business on a friendly competitive basis, and pointed out that there is considerable difference between an agreement and an exhortation. The first Gary dinner was held shortly after the beginning of the panic of 1907. Judge Gary testified that officers of the Steel Corporation were requested by various consumers to do everything possible to prevent demoralization of business. Many of the customers of the Corporation had large stocks of steel on hand, and if the prices became demoralized, as they had in previous years, there was great danger of loss to them, and perhaps failure.

Gary Dinners

"We had on our books accounts receivable aggregating hundreds of millions of dollars," testified Judge Gary, "and an ordinary old fashioned steel war meant destructive competition, the survival of the fittest and ruin, or at least temporary suspension, of a great many concerns. In previous years, the steel makers did business in times like that almost as enemies rather than as friends and resorted to various measures which were intended, if possible, to force competitors out of business. The object and purpose of the Gary dinners were to bring together, into friendly contact, the men engaged in the iron and steel industry. There is nothing like close contact with a competitor to secure fair and decent treatment. It is impossible, I think, to prevent sharp competition. I invited these gentlemen to this first dinner for the purpose of referring to the general financial or business situation, and for the purpose of thoroughly establishing, if possible, a friendly feeling among the steel makers, and to induce, if possible, the manufacturer to state frankly and freely what they were doing, how much business they were doing, what prices they were charging and wages they were paying their men, and, in fact, furnish frankly one to the other, all information concerning their business."

Judge Gary denied that there was any discussion of fixing prices at the first or at any subsequent dinners. He added that he made it plain to the assembled manufacturers that they could not make any agreement, expressed or implied, directly or indirectly, which would bind them to the maintenance of prices, the restriction of territory or output.

Rail Prices

Referring to the prices of rails, which have been maintained on a basis of $28 for a number of years, Judge Gary said that at different times the Steel Corporation had been asked to name a higher quotation, but he personally did not believe in taking advantage of an increased demand by fixing prices above what he considered reasonable. He added that the standard price of Bessemer rails has been maintained at $28, or, strictly speaking, has been kept down to $28, largely because the United States Steel Corporation for many years has declined to advance its price above that figure. He explained that the manufacturers of rails are comparatively few in number and they deal more or less with the same railroads and they know all the time what the others are doing. He described at length the practice of the leading railroads with reference to the distribution of tonnage to the mills on their lines, which, to a large extent, is controlled by the amount of freight received from the various mills by the railroads. Judge Gary testified that the impression which has prevailed that the profit on rails is very large is wrong, and although the price has remained unchanged for a number of years, nevertheless, the cost of manufacture has materially increased.

Judge Gary denied the existence of any agreement with foreign rail manufacturers relative to the distribution of tonnage and he explained that no such agreement relating to this or any other product has ever been entered into with manufacturers of other countries.

FOREIGN BUYERS

Send More Inquiries For Pig Iron—Considerable Tonnage Shipped.

New York, June 3.—Foreign buyers have recently been putting out considerable additional inquiry for pig iron before eastern and southern sellers, and a considerable tonnage of this character has already been closed, principally for shipment to southern Europe and Mediterranean points. Recent inquiries, aggregating 7,000 tons, which were pending in the Philadelphia market, have been disposed of and this business is understood to have gone to a leading southern maker. The United States Steel Products Co. has just booked 1,500 tons of No. 2 for shipment to Genoa, Italy. New inquiries have appeared for 7,000 to 8,000 tons, including one lot of 5,000 tons of No. 2 and 2,000 tons of No. 3. The shipping point for one of these lots is specified as Frankfort, Germany, and the other for England. Other inquiries include 1,000 tons of special analysis iron for shipment to Liverpool and another inquiry for 1,000 tons, the destination of which has not been given.

The prices at which the going export business is being booked have not been clearly shown because of the range in ocean freights, but are indicated to be about the basis of $11 to $11.25, Birmingham, for No. 2.

Completes New Furnace

A new modern 500-ton blast furnace has been practically completed at the plant of the Bethlehem Steel Co., South Bethlehem, Pa., and will be blown in soon. The new furnace is 22 x 90 feet. With the completion of this furnace, the blast furnace plant of the company consists of five large modern furnaces and two smaller stacks with a combined capacity of 1,000,000 tons of pig iron per year. The Pennsylvania Steel Co. has blown out its small Lochiel furnace at Harrisburg, Pa.

Steamships Call for Large Tonnages

And Shipbuilders in the East Take a Hopeful View of Business—Structural Contracts at Chicago More Numerous

Eastern ship yards are inclined to take a very cheerful view of the present business situation, as they have their ways filled with work and a number of new contracts of considerable size are now pending.

The Hamburg-American line is inquiring for four to six vessels, 490 feet in length and of 11 tons displacement. The Mallory line has asked for bids for three steamships, each of which will be more than 400 feet in length and will require about 2,500 tons of plates and shapes. The Southern Pacific railroad is also in the market for a large tank steamer, the length of which will exceed 400 feet. This vessel will require 2,500 to 3,000 tons of steel. Other new construction is pending before eastern ship builders. An inquiry for 2,000 tons of plates for some of this latter work has been put out.

Inquiry by foreign interests is due to their desire to engage in coastwise trade, now restricted to American bottoms.

Eastern and Pittsburgh plate and shape makers are figuring with the ship builders upon the prospective tonnage involved in these contracts.

Structural contracts placed at Chicago during the past week aggregate a much better total than for the preceding week, as they amount to 4,908 tons. The larger part of the fabricators' business is still made up of small jobs, the material for which is being taken principally from store. Prices on fabricated material are shaky, as while some shops in this territory are well occupied, others are having trouble in taking sufficient business to keep their organization intact.

Tight money conditions are retarding building work in New York City, especially in the more speculative classes of work, such as lofts and apartment construction. Many projects are now halted in the planning stage. Reported awards the past week in New York, Philadelphia and other eastern districts, aggregated less than 7,000 tons, most of which was railroad work. Fabricating shops are competing sharply for business in the east.

The Otis Steel Co., Cleveland, is expected to place a contract today for about 2,500 tons for one of the buildings of its new plant.

CONTRACTS PLACED.

William R. Hearst building, Los Angeles, 500 tons.

Oakland auditorium, Oakland, Cal., 2,000 tons, to Dyer Brothers.

Carlston-Snyder building, Oakland, Cal., 682 tons, to Pacific Rolling Mill Co.

Cold storage building, Independent Packing Co., Chicago, 470 tons, to South Halsted Street Iron Works.

Improvements to Brooklyn plaza of Manhattan bridge, 800 tons. General contract awarded to Northeastern Construction Co. Steel work still pending.

Watertown Y. M. C. A., Watertown, N. Y., 500 tons, to Massey Machine Co.

Brass foundry, Yale & Towne Mfg. Co., Stamford, Conn., 950 tons, to Belmont Iron Works.

City hall, Youngstown, Heller Bros., general contractors, 800 tons, to American Bridge Co.

PENDING STRUCTURAL WORK.

Filtration plant, city of Baltimore, 1,000 tons of reinforcing bars. Revised bids to open June 7.

New office building, Proctor & Gamble Co., Cincinnati; concrete, about 200 tons of reinforcing bars needed. Elzner & Anderson, Ingalls building, Cincinnati, architects in charge.

New Miami Hotel, Dayton, O.; about 1,800 tons of steel. The Allyn Engineering Co., Second National Bank building, Cincinnati, architects in charge.

RAILROAD BUYING

Has Been Moderate—Some Orders For Export Taken.

There has been a moderate amount of buying by the railroads during the past week. The Cordoba Central of the Argentine Republic has awarded the United States Steel Products Co. 10,000 tons of rails, and the Manila railways have purchased 1,200 tons of bridge material from the same company.

RAIL SALES AND INQUIRIES.

Lehigh Valley railroad, freight transfer platform at Manchester, N. Y., 600 tons, to McClintic-Marshall Construction Co.

Philadelphia & Reading railroad, additional grade crossing work, Philadelphia, 1,500 tons. Bids asked.

The Chambersburg & Shippensburg railway 1,000 tons, to the Pennsylvania Steel Co.

The Great Northern railroad has entered the market for an indefinite tonnage of rails. It will probably buy a round lot.

Hudson & Manhattan railroad, 600 tons, to Bethlehem Steel Co.

BRIDGE WORK.

The Norfolk & Western, 2,900 tons bridge work, to American Bridge Co.

Lehigh Valley railroad, 500 tons for five small bridges. Bids taken.

Brooklyn Rapid Transit Co., 600 tons for connecting Myrtle avenue and Broadway elevated lines in Brooklyn. Bids asked.

Scrap Market Very Weak

Pittsburgh, June 4. (By wire.)—The scrap market shows more weakness now than for years in the opinion of dealers here. Heavy melting steel is not above $13 in this market and the shipments have been stopped by a number of large consumers. Almost every sort of scrap has declined practically 50 cents within the past week and the market in others is purely nominal. The unusual accumulation of this material has brought about this condition, as consumption has been up to the average. Practically every transaction sets a new low level.

Canadian Companies Are Merged

A merger has been effected between the Gananoque Spring & Axle Co., Ltd., the D. F. Jones Mfg. Co., Ltd., of Gananoque, and the Dowsley Spring & Axle Co., of Chatham, Ont., under the name of the Steel Products of Canada, Ltd. It will have a capitalization of $2,100,000, of which $750,000 will be common stock; $750,000 preferred stock; and $600,000 6 per cent bonds. It is understood that 75 per cent of the securities of the new company has been taken instead of cash by the new stockholders of the amalgamated companies, and that the balance will be offered to the public. W. J. Sampson, for many years manager of the Gananoque Spring & Axle Co., will act as managing director. It is understood that the directorate will include the names of a number of prominent men in the steel industry.

Proposed Armor Plant Plant

Washington, June 2.—Representative Barton, Nebraska, this afternoon introduced a resolution asking that a special committee be elected with instructions to report on the third day of the regular session of congress next December a bill providing for the establishment by the government of "such manufacturing plants as may be necessary for the production of armor plate for the government." Congressman Barton explained that his resolution was prompted by the recent charge of Secretary of the Navy Daniels that the government is paying exhorbitant prices for armor plate.

REPORT ON COSTS

Will Soon be Issued by the Bureau of Corporations.

Washington, June 3.—Dr. Francis Walker, deputy commissioner in the bureau of corporations, said this morning that the third volume of reports compiled by the bureau pertaining to the steel industry will be ready for distribution in two weeks or less time, according to present indications. This is the final volume and deals with costs in the industry, particular attention being given to the United States Steel Corporation. The work was compiled by Dr. Walker, and has aroused considerable interest. A brief summary of the last volume was issued some time ago by the bureau in the nature of a letter. The volume itself will comprise 500 pages and will give an exhaustive report on the cost system as seen by Dr. Walker.

"It is not customary, nor would it be discreet," said Dr. Walker, "to comment on the report. It will afford all the details itself."

Dr. Walker was also silent regarding the government dissolution suit against the United States Steel Corporation and would not say anything about the testimony of Chairman Gary, President Farrell, his own, or that of any other. He explained that all he had seen in the way of testimony by Corporation witnesses was what had been printed in the newspapers and he did not feel that these meager reports would justify his commenting on the testimony even if he were otherwise inclined. In this connection, he said the testimony of William E. Corey as published in the newspapers gave an entirely different impression to that obtained from reading all his testimony.

Movement of Texas Ore

The East Texas Brown Ore Development Co., Ore City, Tex., has placed in service 17 of the 150 standard ore cars recently ordered, to be used in the shipment of iron ore from the mines northeast of Ore City to Port Bolivar. This means that the Texas iron ore industry has actually commenced. The first actual development work at the mines commenced Monday, May 26, and the first cargo of ore will be shipped to Port Bolivar and loaded on the vessels by June 22. Other cargoes will be shipped regularly at intervals of two weeks. A. M. Nibblett Jr. will have charge of the field work at the mines, under contract, and is actively engaged in recruiting a crew of miners and in arranging for equipment for mining and handling the ore. The first ore to be mined is what is termed "float ore" which is found in large quantities along the edge of ore-bearing hills. This ore is of a very high quality and requires no washing and crushing.

POSITIVE STATEMENT

That Pig Iron and Ferro Will be Placed on the Free List.

Washington, June 3.—Positive information that pig iron and ferro-manganese have been placed on the free list by the subcommittee of the senate finance committee was given out this afternoon by one whose position enables him to speak with the utmost authority. It is not believed that any opposition will be made in the Democratic caucus to the transfer of these items from the dutiable list, and it is apparently certain the majority members of the finance committee will approve the changes.

Fined for Violating Sherman Law

Fines aggregating $81,500 were imposed recently in the United States district court at Rochester, N. Y., by Judge John R. Hazel, in the cases of six corporations and 11 individuals, defendants in the government's action against the so-called "Coaster Brake" trust, for violation of the Sherman law, with two counts of the indictment, conspiring to restrain trade and attempt to monopolize domestic and foreign trade. Four individuals pleaded nolle contendere. Three of the four were among the 11 individuals fined. Six additional cases were discontinued by nolle prosequi. The six corporations involved were the New Departure Mfg. Co., Bristol, Conn.; the Corbin Screw Corporation, New Britain, Conn.; the Eclipse Machine Co., Elmira, N. Y.; the Miami Cycle & Mfg. Co., Middletown, O.; the Buffalo Metal Goods Co., Buffalo, and the Aurora Automatic Machinery Co., Chicago.

Pennsylvania Steel Re-elects.—At a recent meeting of the board of directors of the Pennsylvania Steel Co., Edgar C. Felton, president, and the other present officers, were re-elected for the ensuing year. Frederick W. Wood, Sparrows Point, Md., is vice president, Frank Tenney, secretary, Edmund N. Smith, treasurer and Frank S. Reitzel, comptroller. The latter three are all of Philadelphia.

EXTENSIVE BUILDING

Indicated by Subsidies Granted Canadian Roads.

The extent of railway construction contemplated in Canada is shown by the following list of subsidies granted by parliament to railways last week: $15,640,000 to the Canadian Northern railway for lines from Ottawa to Port Arthur, Edmonton to British Columbia, and $1,600,000 from Toronto to Ottawa. The Temiscaming & Northern Ontario railway is subsidized $6,400 per mile on lines from North Bay to Cochrane, Englehart to Charlton, Cobalt to Kerr Lake, Iroquois to Timmins, Earlton to Elk Lake, Iroquois Station to Iroquois Falls, a total distance of 338 miles. Other subsidies at $6,400 per mile are to the Margaree Coal & Railway Co., 46 miles; Northern New Brunswick railway, 16 miles; Tobique & Campbelltown railway, 28 miles; St. John & Quebec railway, 200 miles; Lotbiniere & Megantic railway, 95 miles; Little Nation railway, 30 miles; Erie, London & Tilsonburg railway, 45 miles; Alberta Central railway, 70 miles; Kettle Valley railway, 335 miles; Calgary & Fernie railway, 100 miles; for bridge over Burrard Inlet, $350,000, and for Canadian Pacific railway, Gimli to Yolandic river, 30 miles.

To Build Puddling Mill

A new plant for the manufacture of high grade muck bars is to be built at Danville, Pa., by Howe & Samuel, who have been carrying on this line of manufacture in part of the property of the Danville Structural Tubing Co. New buildings are to be erected and a group of eight double puddling furnaces equipped with modern waste heat boilers will be installed. The present roughing mill will probably be used in the new plant. This construction will add considerably to the present output of the firm. The Danville Structural Tube Co. has also decided to proceed with some important extensions of its present plant.

Death of Hammond Dietrick

Hammond Dietrich, one of the founders and member of the firm of Dietrich Bros., Baltimore steel jobbers and fabricators, died May 30, at Johns Hopkins hospital, following an operation. He was one of the best known steel jobbers in the eastern district and enjoyed a wide and favorable acquaintance among the trade. Mr. Dietrich had not been in good health for some time past.

IRON AND STEEL PRICES

Pig Iron

PITTSBURGH

(Through Third Quarter.)

Bessemer	$17.50
Basic	15.65
No. 2 foundry	15.40
Malleable	15.40
Gray forge	14.90

The freight rate from valley points is 90c.

CLEVELAND

(Through this Year Delivered in City.)

No. 1 foundry	$15.50 to 15.75
No. 2 foundry	15.00 to 15.25
No. 2 southern	15.60 to 16.10
Bessemer	17.50
Silveries 8 per cent silicon	20.55

CINCINNATI

(Through This Year.)

Southern foundry No. 1	$14.75 to 15.25
Southern foundry No. 2	14.25 to 14.75
Southern foundry No. 3	13.75 to 14.25
Southern foundry No. 4	13.50 to 14.00
Southern gray forge	13.25 to 13.75
Mottled	13.25 to 13.50
Southern No. 1 soft	14.75 to 15.25
Southern No. 2 soft	14.25 to 14.75
Standard southern car wheel	27.25 to 27.75
Southern Ohio No. 2	16.20 to 16.70
Southern No. 3	15.70 to 16.20
Southern Ohio No. 4	15.45 to 15.95
Silveries 8 per cent silicon	19.70 to 20.20

CHICAGO

(Delivered Chicago, this year, except northern foundry and malleable Bessemer, which are quoted f. o. b. local furnaces.)

Lake Superior charcoal	$18.00 to 19.25
Northern foundry No. 2	16.00 to 16.50
Southern foundry No. 2	15.60 to 16.35
Jackson co. silveries, 8 per cent	21.40
South'n silveries, 5 per cent sil.	18.35
Alabama basic	17.85
Malleable	16.00 to 16.50

PHILADELPHIA

(Prompt and second quarter shipment delivered to consumer's plants, in Philadelphia and vicinity, unless otherwise specified.)

Northern No. 1X foundry	$16.75 to 17.00
Northern No. 2X foundry	16.50 to 16.75
Northern No. 2 plain	16.00 to 16.50
Standard forge (Eastern Pa.)	15.50 to 15.75
Virginia No. 2X	16.80 to 17.05
Southern No. 2	15.75 to 16.25
Standard low phos., Phila	23.25 to 23.50
Malleable	17.25 to 17.50
Basic (Eastern and Central Pa.) (nominal)	16.50

NEW YORK

(Prompt and second quarter delivery, prices based at Jersey City and tidewater.)

Northern No. 1X foundry	$16.75 to 17.00
Northern No. 2X foundry	16.25 to 16.75
Northern No. 2 plain	16.00 to 16.25
Virginia No. 2X	16.80 to 17.05
Southern No. 2	16.50 to 17.00
Malleable	16.50 to 17.00
Gray forge	15.50 to 15.75

ST. LOUIS

(Throughout this year.)

Southern No. 1	$15.50 to 16.00
Southern No. 2	15.00 to 15.75
Southern No. 3	14.50 to 15.00
Southern No. 4	14.25 to 14.75

(Freight, Birmingham to St. Louis, $3.75)

BIRMINGHAM

(For southern delivery.)

No. 1 foundry	$12.00
No. 2 foundry	11.50
No. 3 foundry	11.25
No. 4 foundry	11.00
Gray forge	10.75
Mottled	10.50
Standard basic	11.50
Off basic	11.00
Charcoal	25.00

BUFFALO

(Through this year, delivered in city.)

No. 1 foundry	$15.00 to 15.50
No. 2X foundry	14.75 to 15.00
No. 2 plain	14.50 to 14.75
No. 3 foundry	14.25 to 14.50
Gray forge	14.25
Malleable	15.00 to 15.25
Basic	16.00 to 16.50
Charcoal	16.50 to 17.50

Ferro Alloys

English 80 per cent ferro-manganese, $59 to $61, seaboard, early and forward.

Fifty per cent ferro-silicon on contracts, $75, Pittsburgh, or Philadelphia, for carloads; $74 for larger lots and $73 for 600 tons or more. Twelve to 13 per cent, $26. Eleven to 12 per cent, $25. Ten to 11 per cent, $24. Nine to 10 per cent, $23, f. o. b. Globe, Jisco and Ashland furnace. Freight to Pittsburgh, $1.90.

Ferro-carbon titanium 8 cents per pound for carload lots; 10 cents per pound for 2,000-pound lots and over; 12½ cents per pound in lots up to 2,000 pounds.

Freight rates on ferro-manganese, foreign spiegeleisen and electrolytic ferro-silicon from Baltimore to Pittsburgh, $2.16; to Youngstown, $2.48; to Cleveland, $2.57; to Detroit and Columbus, $2.99; to Cincinnati, $3.40; to Chicago and Milwaukee, $4.00. Freights from Philadelphia and New York, 10 and 30 cents higher respectively.

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 pounds, to:—

New York	16 cents
Philadelphia	15 cents
Boston	18 cents
Buffalo	11 cents
Cleveland	10 cents
Cincinnati	15 cents
Chicago	18 cents
St. Louis	22½ cents
Denver	84½ cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, shapes and plates	80 cents
Pacific coast, sheets, No. 11 and heavier	80 cents
Pacific coast, sheets, Nos. 12 to 16	85 cents
Pacific coast, sheets, No. 16 and lighter	95 cents
Pacific coast, wrought pipe and boiler tubes	65 cents

Coke

AT THE OVENS.

Connellsville district:	Prompt shipment.	Contract.
Foundry coke	$2.85 to 3.25	$3.00 to 3.25
Furnace coke	2.00 to 2.25	2.25 to 2.50
Wise county district:—		
Foundry coke	$2.60 to 2.75	$2.75 to 3.00
Furnace coke	2.15 to 2.50	2.25 to 2.50
Pocahontas district:—		
Foundry coke	$2.75 to 3.00	$2.75 to 3.00
Furnace coke	2.25 to 2.50	2.50
New River district:—		
Foundry coke	$3.25 to 3.50	$3.25 to 3.50
Furnace coke	2.50 to 2.60	2.60 to 2.90

Iron Ore

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, $4.40; Mesabi Bessemer, $4.15; old range non-Bessemer, $3.60; Mesabi non-Bessemer, $3.40; all at lower lake ports.

Foreign iron ores, 7½ to 8 cents per unit, f. o. b. cars eastern seaboard. Freight rates from Philadelphia to eastern Pennsylvania, furnace points range from 35 to 75 cents per ton.

Billets and Sheet Bars

PITTSBURGH

For prompt and forward delivery, Bessemer 4 x 4 billets with 0.25 carbon and less, $26.50 to $27.00; open-hearth rolling billets, $26.50 to $27.50; Bessemer sheet and tin bars, $27.50; open-hearth sheet bars, $27.50, f. o. b. Pittsburgh and Youngstown. Forging billets, $35, Pittsburgh.

PHILADELPHIA

Delivered to consumers' plants in Philadelphia and vicinity: 4 x 4-inch open-hearth and Bessemer rolling billets at $28 to $30, and forging billets at from $34 to $36.

Standard Shapes

PITTSBURGH

Standard structural shapes, 1.45c to 1.50c. For extras see card of Sept. 1, 1909.

CHICAGO

Standard structural shapes, 15 inch and under, 1.63c to 1.68c.

PHILADELPHIA

Delivered to consumers in Philadelphia and vicinity. Standard structural shapes from Eastern Pennsylvania mills on contract 1.60c to 1.65c; for prompt delivery, 1.60c to 1.70c. From Pittsburgh mills 1.60c.

NEW YORK

Standard structural shapes for second quarter delivered at New York by eastern Pennsylvania makers 1.61c to 1.66c. On third quarter and last half contracts, Pittsburgh district makers are quoting from 1.61c to 1.66c, New York.

Plates

PITTSBURGH

Standard steel plates ¼ inch thick, 6¼ to 100 inches, 1.45c to 1.50c. For extras, see card of Sept. 1, 1909.

CHICAGO

Tank plates, 1¼ inch thick, 6¾ to 100 inches wide, 1.63c to 1.68c.

PHILADELPHIA

Delivered to consumers' plants in Philadelphia and vicinity. Tank plates from eastern Pennsylvania mills for prompt or contract delivery 1.75c; universal plates 1.75c to 1.80c. From Pittsburgh mills, tank and universal plates 1.60c to 1.65c.

NEW YORK

Steel plates, tank quality, for second quarter delivery at New York by eastern Pennsylvania makers, 1.76c. On small lots of universal plates $1 extra asked by some makers; on third quarter and last half contracts,

Pittsburgh makers are quoting 1.61c to 1.66c, New York.

Sheets and Tin Plate

PITTSBURGH

No. 28 black	2.35c
No. 28, tin mill black	2.30c
No. 28, galvanized	3.40c to 3.50c
No. 10 blue annealed	1.75c
Painted corrugated	2.55c
Galvanized corrugated	3.55c
Tin plate, 100 pound cokes	$3.60

PHILADELPHIA

Delivered to consumers' plants in Philadelphia and vicinity: No. 10 gage annealed sheets at 1.90c.

Pipe and Boiler Tubes

PITTSBURGH

	Black, Butt.	Galv. Weld.
Steel ¼ to 3 inches	79	70½
Iron, ¼ to 2½ inches	73	62
BOILER TUBES.		
Steel, 3½ to 4½ inches	69	..
Iron, 3½ to 4½ inches	58	..

Other sizes of pipe and tubes take the usual advances as per official cards.

Rails and Track Material

PITTSBURGH

Steel rails, 50-pound and heavier, 1.25c per pound for Bessemer and 1.34c for open-hearth; carload lots less than 500 tons 1.34c per pound; light rails on base weight of 40 to 45 pounds, 1.25c, schedule on the other weights being irregular and subject to negotiations; angle bars for standard sections, 1.50c, base, Pittsburgh; track bolts, 2.40c to 2.50c base, Pittsburgh.

Railroad spikes, 4½, 5 and 5½ and 9-16 inch, 1.80c.

CHICAGO

Light rails, carloads, 25 to 45-pound, 1.25c, base; 16 to 20-pound, 1.30c; 12-pound, 1.35c; 8-pound, 1.40c.

Light section relayers, 45 pounds and under, subject to inspection, $22 to $23; standard section relaying rails, subject to inspection, $23 to $24.

Track fastenings f. o. b. Joliet:

Angle bars, 1.50c; railroad spikes, 1.80c to 1.90c; smaller size spikes, 2.05c, base; track bolts with square nuts, 2.30c to 2.40c.

Bars, Hoops and Bands

PITTSBURGH

Common iron bars, 1.70c to 1.80c, Pittsburgh; Bessemer and open-hearth steel bars, 1.40c; plow and cultivator 1.40c; channels, angles, zees, tees, under 3 inch, 1.50c, all f. o. b. mill.

Hoops in carload lots, 1.60c, Pittsburgh, in less than carload lots, 1.65c; bands, 1.40c, base, with net extras, as per standard steel.

Cold rolled and ground shafting, 60 and 58 per cent off in carloads and 55 and 53 per cent in less than carloads delivered in base territory.

CHICAGO

Bar iron 1.50c to 1.57½c; hard steel bars rerolled, 1.65c to 1.75c; soft steel bars, bands and small shapes, 1.58c; hoops, 1.63c; smooth finished machinery steel, 1 inch and larger, 1.78c; shafting, 58 per cent off list for carload lots, 53 per cent off for less than carloads.

PHILADELPHIA

Delivered in consumers' plants in Philadelphia and vicinity: Steel bars 1.55c to 1.60c on contract and common bar iron, 1.55c to 1.60c. Prompt steel bars on mill shipments, 1.85c to 1.90c, delivered. Cut nails 1.90c to 1.95c, Philadelphia. Shafting 60 and 58 and 55 and 53 off in base territory.

NEW YORK

Delivered in New York, steel bars on contract from 1.56c to 1.61c, and common iron bars, 1.45c to 1.60c.

Bolts, Nuts and Rivets

Rivets

Button head structural rivets, 2.15c to 2.20c, Pittsburgh, cone head boiler rivets, 2.25c to 2.30c. Small rivets, 75, 10 and 10 off.

Structural rivets, Chicago, 2.08c to 2.18c; boiler rivets, 0.10c extra.

Bolt and Nut Discounts

(Delivered within a 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, smaller and shorter, rolled threads, 75 and 10; cut threads 75 and 5; larger and longer, 70 and 2½.

Machine bolts with hot pressed nuts, ⅜ x 4 inches, smaller and shorter, rolled 75, 10, and 5; cut, 75 and 10; larger and longer, 70 and 7½.

Gimlet and cone point lag or coach screws, 80 and 10.

Hot pressed square, blank or tapped nuts, $5.70 off list; hot pressed hexagon blank or tapped, $6.30.

Cold pressed C. & T. square, blank or tapped, $5.70 off; hexagon, blank or tapped, ⅝-inch and larger, $6.60 off; ½-inch and smaller, $7.20 off.

Wire Products

PITTSBURGH

Wire nails, jobbers' carload lots, $1.80, retailers' carload lots, $1.85, cut nails (western makers), jobbers' lots, $1.70; painted barb wire, jobbers' carload lots, $1.80; retailers' carload lots, $1.85, with 40c for galvanizing; plain wire to jobbers in carloads, $1.60; and to dealers in carloads, $1.65; polished staples, $1.80; galvanized staples, $2.20.

CHICAGO

Wire nails, jobbers' carload lots, $1.93 to $1.98; retailers' carload lots, $1.98 to $2.05; retailers' less than carload lots, $2.03 to $2.08; painted barb wire, jobbers' carload lots, $1.93 to $1.98; retailers' carload lots, $2 to $2.05; retailers' less than carload lots, $2.03 to $2.08, with 40c for galvanizing; plain wire, jobbers, carload lots, $1.73; retailers' carload lots, $1.78.

Cast Iron Pipe

CHICAGO

Four-inch water pipe, $28; 6 to 12 inches, $27; larger sizes, $25; gas pipe, $1 a ton higher.

NEW YORK

Six-inch pipe, 30 pounds to the foot, $23 to $25, f. o. b. New York, in carload lots.

BIRMINGHAM

Water main: 4-in., $20.50; 6-in. and up, $19.50. Gas main: $1 per ton higher than water main. Special fittings, $42.50 to $47.50.

Old Material

PITTSBURGH

Gross tons delivered.

Heavy melting scrap	$13.50
Rerolling rails	15.00 to 15.25
Malleable	12.50 to 13.00
Agricultural malleable	12.00 to 12.50
Bundled sheet scrap	10.00 to 10.50
Iron axles	25.50 to 26.00
Old iron rails	15.00 to 15.50
Stove plate	10.00 to 10.25
No. 1 wrought scrap	15.00 to 15.25
Old car wheels	14.50 to 14.75
Low phosphorus	16.00 to 16.25
Machine shop turnings	7.00 to 7.50
No. 1 busheling	12.75 to 13.00
Cast borings	9.00 to 9.50
No. 1 cast scrap	14.25 to 14.50

PHILADELPHIA

Gross tons delivered to consumers' plants in eastern Pennsylvania and western New Jersey:

Old iron rails	$17.00 to 17.50
Old steel rails (rerolling)	15.00 to 15.50
No. 1 heavy melting steel	11.75 to 12.00
Old car wheels	13.00 to 13.50
Old iron axles (nominal)	25.00 to 26.00
Old steel axles	17.50 to 18.00
No. 1 railroad wrought	14.50 to 15.00
Wrought pipe	12.00 to 12.50
Cast borings	8.00 to 8.50
Machine shop turnings	8.00 to 8.50
Heavy cast (broken)	13.00 to 13.50
Malleable	12.00 to 12.50
Stove plate	9.00 to 9.50
No. 1 forge	10.00 to 10.50
Low phosphorus	16.25 to 16.75

Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: $0.60 to Ivy Rock, Pa.; $0.65 to Phoenixville, Pa.; $0.80 to Contesville, Pa.; $0.85 to Bethlehem, Pa., Reading, Pa., and Roebling, N. J.; $1.10 to Pottsville, Pa., Lebanon, Pa., and Columbia, Pa.; $1.20 to Harrisburg and Steelton, Pa.; $1.40 to Milton, Pa.

CLEVELAND

Gross Tons

Old iron rails	$15.00
Old steel rails (under 3 ft.)	13.00 to 13.50
Old steel rails (over 6 ft.)	12.75 to 13.25
Relaying rails	23.00 to 25.00
Old steel boiler plate	9.00 to 9.50
Malleable iron (railroad)	12.00 to 12.50
Axle turnings	9.00 to 9.50
Steel axles	19.50 to 20.00
Malleable iron (agricultural)	10.00 to 10.50
Heavy steel	11.50 to 12.00
Country mixed steel	9.00 to 9.50
Bundled sheet scrap	8.00 to 8.50

Net Tons

No. 1 R. R. wrought	$11.50 to 12.00
No. 1 busheling	10.25 to 11.00
No. 1 machine cast	11.00 to 11.50
No. 1 dealers' wrought	9.50 to 10.00
Machine shop turnings	3.75 to 4.25
Pipes and flues	7.50 to 8.00
Wrought drillings	3.75 to 4.25
Cast borings	6.00 to 6.50
Stove plate	7.75 to 8.25
Wrought iron arch bars	16.00
Wrought iron piling plate	14.00

CHICAGO

(Delivered in consumers' yards.)

Gross Tons.

Old car wheels	$14.00 to 14.50
Old iron rails	15.50 to 16.00
Rerolling rails (5 ft. and over)	13.25 to 13.75
Old steel rails, (3 ft. and und.)	11.75 to 12.25
Frogs, switches and guards	10.75 to 11.25
Heavy melting steel	10.75 to 11.25
Shoveling steel	10.50 to 11.00

Net Tons.

No. 1 R. R. wrought	$10.75 to 11.25
No. 2 R. R. wrought	10.00 to 10.50
Arch bars and transoms	14.75 to 15.25
Knuckles, couplers and springs	11.25 to 11.75
Shafting	15.00 to 15.50
Iron car axles	20.75 to 21.25
Steel car axles	17.00 to 17.50
Locomotive tires	12.00 to 12.50
Dealers' forge	10.00 to 10.50
Pipe and flues	8.00 to 8.50
No. 1 cast	11.25 to 11.75
No. 1 busheling	9.00 to 9.50
No. 2 busheling	6.75 to 7.25
No. 1 boiler cut	8.25 to 8.75
Boiler punchings	12.00 to 12.50
Cast and mixed borings	5.25 to 5.75
Machine shop turnings	5.50 to 6.00
Railroad malleable	12.00 to 12.50
Agricultural malleable	10.50 to 11.00
Angle bars, splices, etc., iron	14.50 to 15.00
Angle bars, steel	10.25 to 10.75
Stove plate and light cast scrap	9.50 to 10.00

NEW YORK

Gross tons, New York dealers' prices at tidewater, usually for Eastern Pennsylvania delivery:

Old car wheels (nominal)	$11.00 to 11.50
Steel axles	15.50 to 15.75
Old steel shafting	14.25 to 14.50
No. 1 heavy melting steel	9.50 to 9.75
No. 1 R. R. wrought	12.50 to 12.75
Wrought pipe (not galvanized)	9.00 to 9.25
Cast borings	6.25 to 6.50
Machine shop turnings	6.25 to 6.50
Heavy cast	11.25 to 11.50

Stove plate	$7.50 to 8.00
Grate bars	7.00 to 7.25

Freight rates on scrap per ton to Steelton, Pa., Columbia, Pa., Pottsville, Pa., and Harrisburg, Pa., are $1.50 from Jersey City, and $2.00 from New York; to Coatesville, Pa., Ivy Rock, Pa., Phoenixville, Pa., and Reading, Pa., $1.50 from Jersey City, and $1.80 from New York; to Bethlehem, Pa., $1.10 from Jersey City, and $1.60 from New York; to Roebling, N. J., $1.00 from Jersey City, and $1.50 from New York; to Milton, Pa., $1.60 from Jersey City, and $2.00 from New York; to Jersey City, $1.00 from New York; to Newark, $1.10 from New York.

CINCINNATI

Gross Tons.

Old iron rails	$12.25 to 12.75
Old steel re-rolling	10.75 to 11.25
Old iron axles	16.75 to 17.25
Heavy melting scrap	10.25 to 10.75
Relaying rails	19.50 to 20.00
Bundled sheet scrap	7.00 to 7.50

Net Tons.

Old No. 1 R. R. wrought	$9.75 to 10.25
No. 1 yard wrought	7.50 to 8.00
No. 1 machine cast	10.00 to 10.50
No. 1 busheling	8.25 to 8.75
Stove plate	7.75 to 8.25
Machine shop turnings	5.75 to 6.25
Cast borings	5.50 to 6.00
Heavy turnings	6.00 to 6.50
Mixed cast	8.50 to 9.00
Breakage	6.25 to 6.75
Malleable	7.75 to 8.25

BIRMINGHAM

Old iron axles, (light)	$15.00 to 15.50
Old steel axles, (light)	15.00 to 15.50
Old iron rails	13.50 to 14.00
No. 1 R. R. wrought	12.00 to 12.50
No. 2 R. R. wrought	10.00 to 10.50
No. 1 country wrought	9.50 to 10.00
No. 2 country wrought	8.50 to 9.00
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	10.50 to 11.00
Tram car wheels	10.50 to 11.00
Standard car wheels	12.00 to 12.50
Light cast and stove plate	8.25 to 8.75

BUFFALO

Heavy melting steel	$11.50 to 12.00
No. 1 R. R. wrought scrap	13.50 to 14.00
No. 1 R. R. and mch. cast scrap	13.50 to 14.00
Old steel axles	17.50 to 18.00
Car wheels	14.25 to 14.75
Railroad malleable scrap	12.50 to 12.75
Wr'ght iron and soft steel turn.	6.00 to 6.50
Cast iron borings	7.50 to 8.00
Low phos. steel scrap	17.00 to 17.50
Old iron rails	15.00 to 15.50
Boiler plate, sheared	13.50 to 14.50
Stove plate (net ton)	9.75 to 10.00
Locomotive grate bars	10.00 to 10.50
No. 1 busheling scrap	10.50 to 11.00
No. 2 busheling scrap	8.00 to 8.50

ST. LOUIS

(Dealers' buying prices.)

Gross Tons

Old car wheels	$13.50 to 14.00
Old iron rails	13.00 to 13.50
Rerolling rails (5 ft. and over)	13.25 to 13.50
Old steel rails (3 ft. and under)	11.00 to 11.50
Light sec. relayers (45 pounds and under) subject to inspec.	23.50 to 24.50
Relaying rails, subject to inspec.	23.50 to 24.50
Frogs, switches and guards	11.25 to 11.50
Heavy melting steel	10.75 to 11.25
Shoveling steel	9.25 to 9.75

Net Tons

No. 1 railroad wrought	$11.00 to 11.50
No. 2 railroad wrought	10.50 to 11.00
Arch bars and transoms	13.50 to 14.00
Knuckles, couplers, springs	10.00 to 10.50
Shafting	13.50 to 14.00
Steel car axles	17.50 to 18.00
Iron car axles	21.00 to 21.50
Locomotive tires	11.00 to 11.50
Pipe and flues	6.50 to 7.00
Tank iron and cut boilers	6.50 to 7.00
No. 1 cut busheling	9.50 to 10.00
No. 2 cut busheling	7.50 to 7.75
Cast and mixed borings	6.25 to 6.75
Machine shop turnings	7.25 to 7.75
Railroad malleable	10.50 to 11.00
Agricultural, malleable	9.00 to 9.50
Stove plates	8.00 to 8.25
Angle splice bars (iron)	12.50 to 13.00
Angle splice bars (steel)	11.00 to 11.25

Store Prices

CINCINNATI

Steel bars, 2.10c; iron bars, 2c; plates and shapes, 2.20c; sheets, blue annealed No. 10, 2.40c; black, No. 28, 2.85c; galvanized, No. 28, 3.95c; cold rolled shafting, round, square, hexagon and flat, 50 off.

CLEVELAND

Steel bars, 2.10c; plates and shapes, 2.25c; iron bars, 2.05c; sheets, No. 10 blue annealed, 2.40c; No. 28 black, 2.85c; No. 28 galvanized, 3.95c.

CHICAGO

Steel bars, 1.95c; iron bars, 1.95c; hoops, 2.50c; shapes and plates, 2.05c; No. 10 blue annealed sheets, 2.25c; black, No. 28, 2.90c; galvanized, No. 28, 4.15c.

PHILADELPHIA

Steel bars 2.05c to 2.10c; structural shapes, 2.00c to 2.10c; plates, 2.00c to 2.10c.

NEW YORK

Steel bars, 2.05c; structural shapes, 2.15c; plates, 2.15c.

PIG IRON INQUIRY

Continues and it is Believed There is Some Quiet Buying.

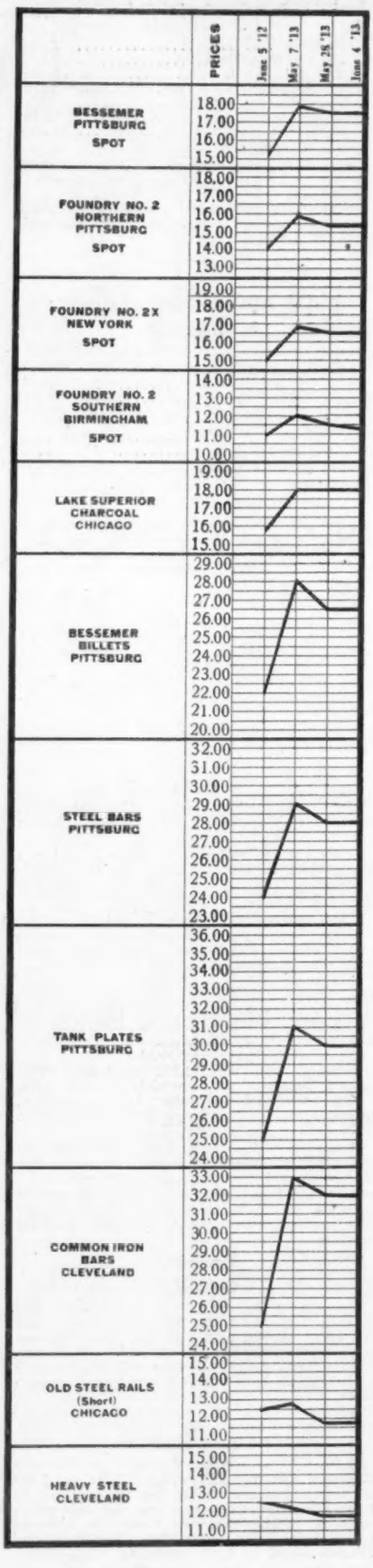
Pittsburgh, June 4. (By wire.)—Pig iron inquiry continues and it is believed that the bottom has been touched and that there is some quiet buying, although rumors of deals cannot be verified. Consumers are working from hand to mouth and producers are being harassed to make immediate shipments on the remainder of contracts for first half. The entire market awaits buying, which is expected at any time and with it advanced quotations. Basic inquiry is most active with some awakening in foundry. Basic is quiet and nominal with a few sales rumored at $16.75.

Jarvis Resigns

Charles M. Jarvis, president of the American Hardware Association, New Britain, Conn., has tendered his resignation on account of ill health. Col. Jarvis succeeded the late Philip Corbin as president three years ago. He had been identified with the corporation since 1900, when he withdrew as the active head of the Berlin Iron Bridge Co. C. M. Thomson, of Hoggan Bros., New York, has been elected to the presidency. He was formerly western manager of P. & F. Corbin, New Britain, Conn.

The employes of the Gray iron foundry of the Webster Mfg. Co., Tiffin, O., walked out recently. The difficulties were settled, however, and the men returned to work. An increase in wages affecting 150 men was granted.

PRICE CHART



Making Cold-Drawn, Seamless Steel Unions

Methods of Manufacture Pursued by the Mark Mfg. Co. in the Production of This New Type of Pipe Coupling

Great progress has been made during the past 40 years in the manufacture of pipe unions until today it is possible to obtain joints that are nearly 100 per cent efficient. Up to the present time, however, practically all the efforts toward improvement have been in the direction of perfecting the usual processes of manufacturing unions from malleable cast iron, brass or bronze. Recently a method of making these pipe connections from flat strip steel by the cold-drawing process has been developed, thus bringing out a union different from its predecessors in many respects. The new unions are being made by the Mark Mfg. Co., Chicago, in a new plant recently added to the pipe mill operated by this company at Evanston, Ill.

The Mark cold drawn union, Fig. 5, consists of the usual three parts, male and female ends joined by a coupling nut. All of these parts, as well as the brass seat ring are drawn cold from flat stock in a series of Toledo punch presses, Figs. 1 and 2, ranging in weight up to over 100 tons. The presses are driven by individual motors varying from 5 to 150 horsepower. There are about 20 operations in the manufacture of each union.

How the Unions Are Made

Fig. 4 illustrates the principal stages in the production of the male member. Strip steel about ⅛-inch thick in the case of a ½-inch union is first cut into circles, 2½ inches in diameter, under a double blanking press as shown at the left in Fig. 1. These discs are then drawn into a deep cup, from which the bottoms are punched, forming a cylinder as shown at *B* in Fig. 4. One end of this tube is then folded or rolled back on itself as indicated at *C* and succeeding operations press this fold into its finished shape. The lower end is upset to form the bead and the part is then ready for threading. The finished male member is shown at *D* and the drawing, punching and upsetting operations are illustrated at the right in Fig. 1 and also in Fig. 2. The press shown in the latter illustration is driven by a 50-horsepower individual motor. The motor with its resistance grids is mounted on the top of the press frame.

The steel seat which is opposed to the soft brass ring in the female end of the union is made specially dense and hard in the drawing operations by applying unusually heavy pressures to the die. The compression alone makes a smooth seat, accurately shaped and polished and there are no machine tool operations in the manufacture of the union aside from the threading. The brass ring is annealed after drawing to keep it soft and when the coupling nut is screwed firmly into place, the dense steel seat makes a joint with the soft brass ring which is said to be leak-proof under extreme pressures.

All of the dies with which the parts of the union are pressed into shape are manufactured in a tool room, Fig. 3, which has been specially equipped for rapid and econo-

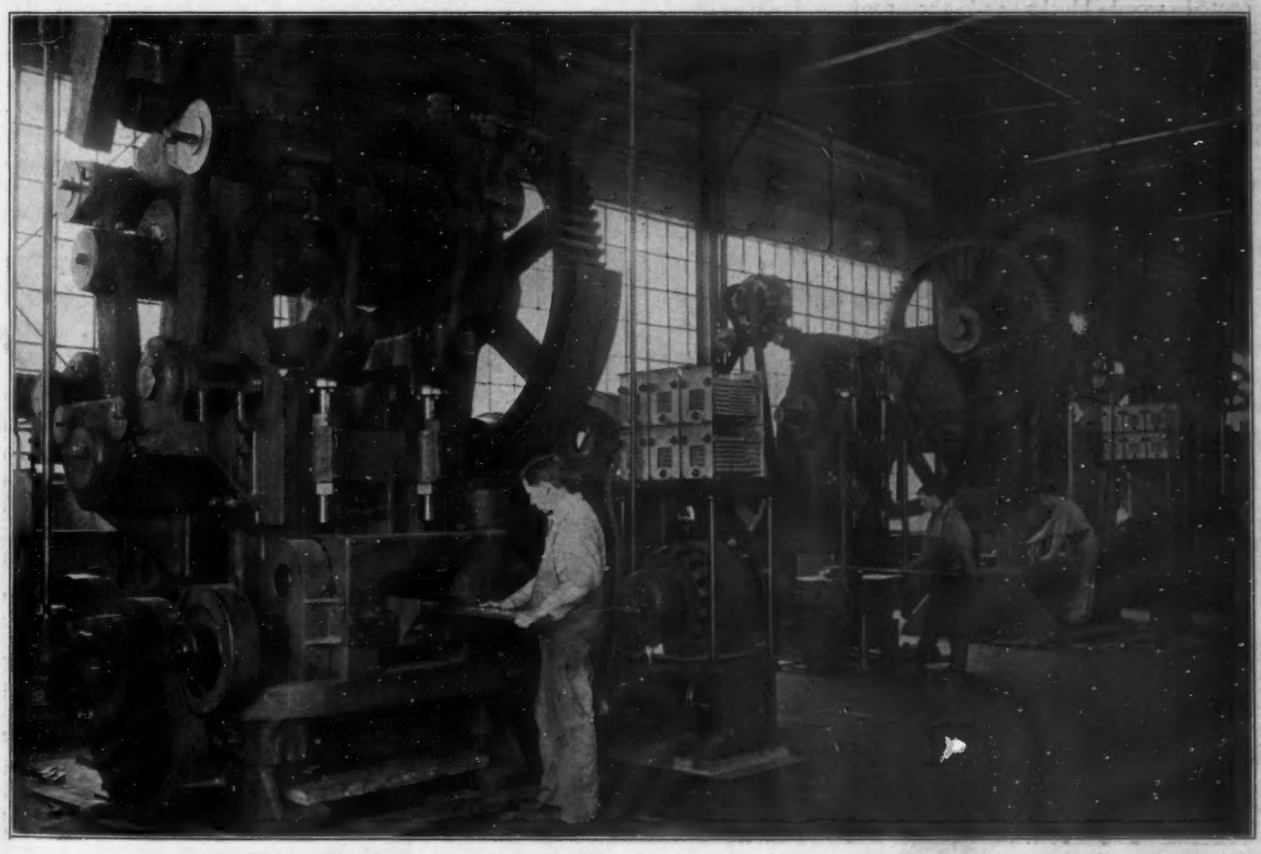


FIG. 1—BLANKING AND FORMING PRESSES FOR MAKING STEEL UNIONS

mical production. All of the lathes, shapers, automatic grinders, milling machines and other tools in the die-sinking department are driven by individual veriable speed motors.

To fortify the unions against rust and corrosion, each part is Shearardized after the threads are cut. The sherardizing process consists of heating the parts together with zinc dust in drums or retorts. The zinc penetrates a short distance into the metal and also leaves a coating. In the cold-drawing process it is of course necessary to occasionally anneal the unions and suitable equipment for this purpose also has been installed. The threading is handled on automatic machines in the usual manner.

The building in which the unions are manufactured embodies many of the latest forms of factory construction. It is of steel and concrete, thoroughly fire-proof and has steel sash running from about 3 feet above the floor almost to the eaves. The floor is paved with Ayer & Lord creosoted wood blocks and the roof consists of cement tiles. The result is a well-lighted, properly-ventilated structure, free from interior columns and well adapted to the purpose intended. The main building is 75 x 200 feet, with a wing 70 x 150 feet.

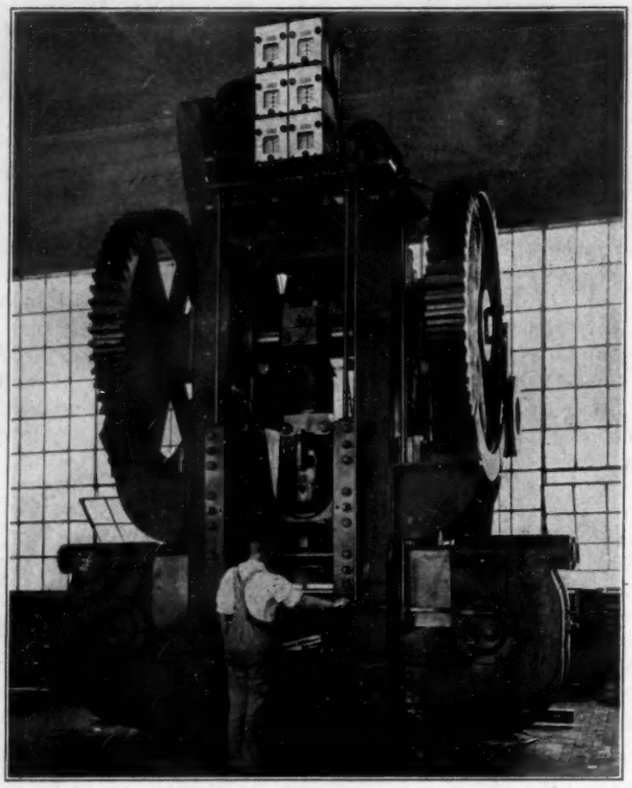


FIG. 2—HEAVY TOLEDO DEEP-DRAWING PRESS USED FOR CUPPING OPERATIONS

The Mark union is threaded to the Briggs standard for pipe threads and carries the same taper as the pipe. In this respect it is different from some other unions which are tapped straight through. Another advantage claimed for the Mark union is that it has the same coefficient of expansion as the steel pipe to which it is connected. This follows from its being made of similar material to that used in the manufacture of the pipe. A heated pipe, therefore, has no tendency to stretch the unions, causing leaks. Owing to the process by which the union is made, it is of course possible to use only high-grade, deep drawing steel, and this is said to give the finished article desirable physical characteristics such as toughness, uniform strength and freedom from pin holes. Equipment has been provided for making unions from ½-inch to 3 inches in diameter, pipe size.

International Engineering Congress

An International Engineering Congress will be held in connection with the Panama-Pacific International Exposition in San Francisco, in 1915, to which engineers all over the world will be invited to participate. The congress is to be conducted under the auspices of the following five societies: American Society of Civil Engineers, American Institute of Mining Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers and Society of Naval Architects and Marine Engineers. The societies have appointed a permanent committee of management, consisting of the presidents and secretaries of these organizations and 18 members resident in San Francisco. A permanent organization has been effected by the election of Prof. William F. Durand as

FIG. 3—DIE SINKING DEPARTMENT OF THE MARK MFG. CO.'S PLANT

chairman and W. A. Cattell as secretary-treasurer. Offices have been established in the Foxcroft building. Ten members of the committee, consisting of the presidents and secretaries of the five national societies, will constitute a committee on participation through whom all invitations to take part in the congress will be issued to governments, engineering societies and individuals.

The papers to be presented will be divided into groups or sections and during the congress each section will hold independent sessions. The scope of the congress has not yet been definitely determined, but it is the intention to make it widely representative of the best engineering practice throughout the world and it is intended that the papers, discussions and proceedings shall constitute an adequate review of the progress made during the past decade.

Heating and Annealing Furnaces

By George J. Hagan

While natural gas is an ideal fuel for melting and annealing furnaces, core ovens, etc., nevertheless, wonderful results have been obtained with underfeed stokers providing the proper distribution of air under the grate bars. In one furnace, equipped in this way, only 512 pounds of common slack coal were used to perform the same work formerly requiring 4,980 cubic feet of natural gas. This furnace was used for heating bars, plates and sheets. Producer gas, although generally considered a satisfactory and economical fuel, should be used in a regenerative furnace to obtain the best results. Tests made on an annealing furnace with producer gas showed a consumption of 334 pounds of gas coal, as compared with 226 pounds of slack coal which was stoker-fired. Considering the difference in the cost of the two grades of coal, cost of operations, power consumption, etc., the results showed a saving of 41.4 per cent in favor of the stokers.

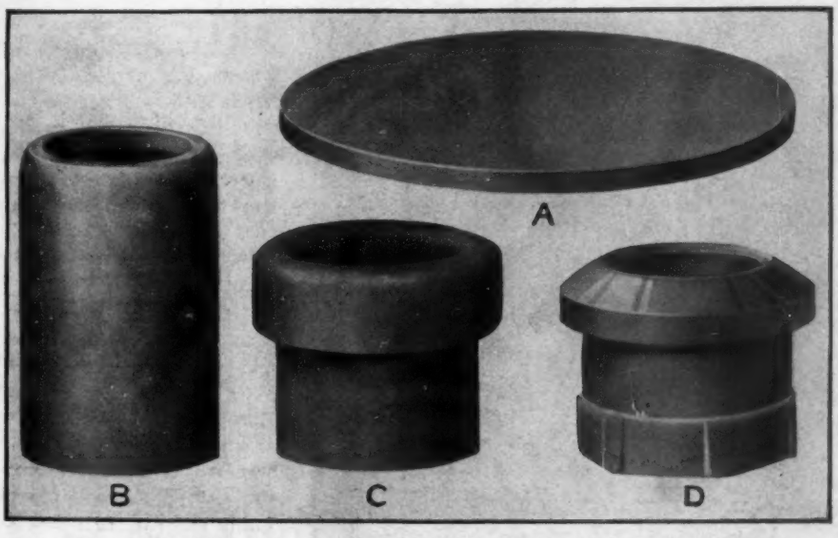


FIG. 4—STAGES OF DRAWING THE MALE END OF A STEEL UNION

While oil is a convenient fuel to employ, its scarcity has increased its cost and for certain classes of work it is not ideal as it is detrimental to the finish of the article treated. It has been found that 12 to 14 pounds of slack coal in a stoker-fired furnace will perform the same work as one gallon of oil.

When the proper stoker is used, a uniform heat at any desired temperature can be obtained. By the elimination of free air in the furnace, the oxidation of the materials being heated is eliminated, as the proper amount of air is being admitted into the furnace with the coal to insure complete combustion.

Cement Production in 1912

According to an advance statement by the United States geological survey, the total quantity of Portland, natural, and puzzolan cements produced in the United States in 1912 was 83,351,191 barrels, valued at $67,461,513, compared with 79,547,958 barrels, valued at $66,705,136, in 1911. This represents an increase in quantity of 3,803,233 barrels, or 4.78 per cent, and in value of $756,377, or 1.13 per cent.

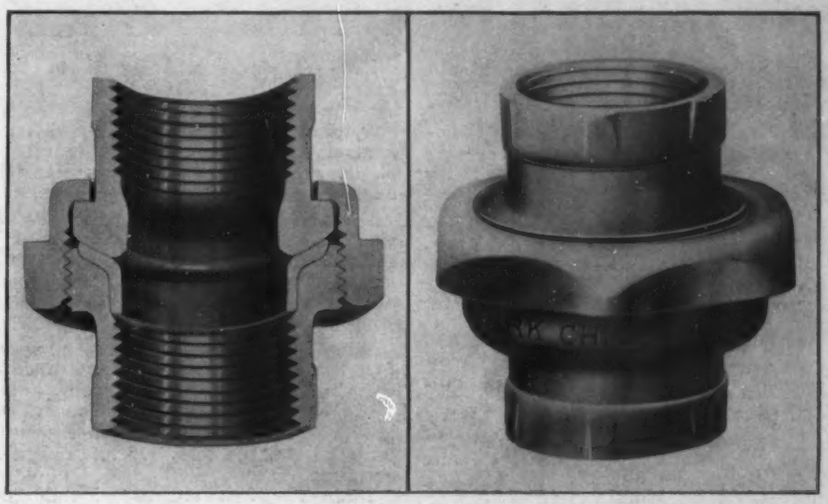


FIG. 5—SECTION OF UNION AND FINISHED COLD-DRAWN UNION

The distribution of the total production among the three main classes of cement in 1912 is as follows; Portland, 82,438,096 barrels, valued at $67,016,928; natural, 821,231 barrels, valued at $367,222; puzzolan, 91,864 barrels, valued at $77,363.

The average price per barrel in 1912, was a trifle less than 81.3 cents, compared with 84.4 cents in 1911. This represents the value of cement in bulk at the mills, including labor and cost of packing, but not the value of the sacks or barrels. In 1912, the quantity exported was only 4,215,532 barrels, most of which was Portland cement, valued at $6,160,341, or approximately $1.46 a barrel, compared with 3,135,409 barrels, valued at $4,632,215, or about $1.477 a barrel, in 1911.

Extensive railway construction planned by the Australian government calls for 150,000 tons of steel rails. There is every reason to believe that this business will be placed with American rail mills.

What is said to be the largest electric crane in the world is now being constructed at Hamburg, Germany. It is designed to lift 275 tons and has a reach of 250 feet.

Modern By-Product Ovens for Coke Manufacture[1]

The Construction and Operation of the Various Types Are Discussed and the Economies Effected by the Use of This Fuel Are Pointed Out

By C A Meissner[2]

It is quite appropriate that this year being the twentieth anniversary of the installation of the first by-product coke ovens in the United States, should be one in which the different technical societies have devoted a great deal of time to the subject by the presentation of a number of valuable and interesting papers.

The earliest form of coke oven was the mound-shaped Meiler, used primarily for charcoal and then for coke burning. The sides and top of the Meilers were made of sod, later of clay and finally developed into stone or brick side-walls. Air passages were provided to permit the proper combustion of the gases. These passages were partly vertical and partly horizontal.

As the walls became more permanent, the passages became flues, and from these were developed the two types of horizontal and vertical flue ovens The Meiler was developed into two distinct types of ovens, the mound or bee-hive, and the rectangular or retort.

The following gives the typical historical events in the development of retort coke ovens with recovery or non-recovery of the by-products:

100 B. C.—It appears that the Chinese used coke as an article of commerce some two thousand years ago, and in the Middle Ages it was manufactured for use in the arts and for domestic purposes.

1620 A. D.—This is the earliest record that we have of coking coal in a regular oven, when a patent was granted to Sir William St. John, in England, for making coke in a bee-hive form of oven.

1700.—J. Becher, a German chemist, was granted a patent to save tar from coking coal, and to utilize it for preserving rope and wood.

1737.—Clayton, of England, appears to have been the first to notice that in addition to coal tar and oils, a combustible gas was formed when coking coal.

1781.—A patent was issued to the Earl of Dundonald for making coke in bee-hive ovens, and also for producing "tar, pitch, essential oils, volatile, alkali, mineral salts, etc.," which appears to be one of the early, fairly successful attempts at saving the by-products.

1792.—Wm. Murdoch, a Scotchman, who was a mechanical engineer, associated with James Watt in steam engine building, is recorded as being one of the first to experiment successfully with making gas from coal, in retorts.

1812.—The streets of London were first lighted by gas, presumably an outcome of Murdoch's experiments.

1826.—The first definite records of bee-hive coke manufactured in England on a fairly large scale for metallurgical purposes.

1830.—The first records of the rectangular, or retort oven in Germany, having open walls, forming a rectangular space which contained the charge. The walls were pierced by horizontal and vertical flues.

1834.—The first gas from retorts in the United States was made, together with gas coke, and William Firmstone, in 1835, made good gray forge iron at the Mary Ann Furnace, in Huntington county, Pennsylvania, from Broad Top coal.

1841.—The first Connellsville coke ovens are said to have been erected and the coke shipped to Cincinnati by water.

1857.—Appolt built his first ovens in the shape of vertical and later horizontal retorts. He utilized the gas only for heating the oven through horizontal flues.

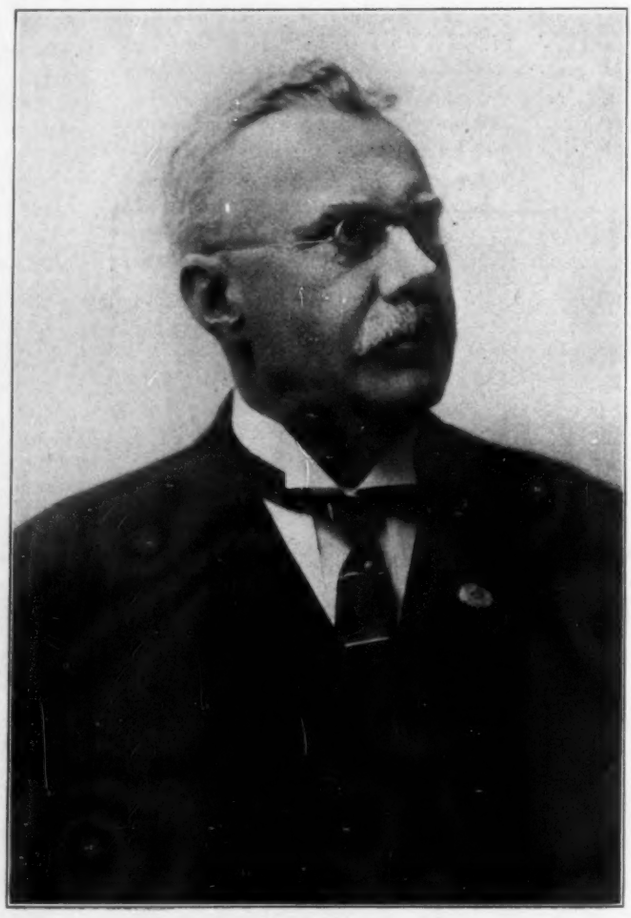
1861.—Coppee built the first Belgian type oven and was the first to demand the use of crushed coal.

1893.—The first battery of Semet-Solvay ovens was built at Syracuse, N. Y.

1895.—The first battery of Otto-Hoffman ovens was built at Johnstown, Pa.

After 1895 progress in the construction of by-product coke ovens in the United States was somewhat slow. The constructive difficulties of a by-product plant were many in the earlier days and the successful mechanical and chemical features in so complicated a system had to be worked out by careful study and experience. The subject was somewhat tempting to many engineers and inventors and, particularly in Europe, a great variety of systems was proposed. Many were tried and failed, so that it was naturally difficult for the American engineer to decide what system to adopt without running too great risk in subsequent operations of the ovens.

Gradually, as the European types were developed, minor types were eliminated more or less and the Europeans settled down to practically three or four standard types, which were the Otto-Hoffman, Koppers, Collin and Coppee. The Semet-Solvay Co., however, was consistently faithful to its early type of horizontal flue oven, and by constant study and experiment finally developed the present six-flue, high regenerative oven. The great advantage which



C. A. MEISSNER

[1]From a paper presented at the annual meeting of the American Iron and Stel Institute.
[2]Chairman, coke committee, United States Steel Corporation.

the by-product coke oven has over the bee-hive oven lies in a number of factors:

1.—The by-product coke plant can be constructed at or near the blast furnaces which are to consume its coke, and thus be under the same management.

2.—It is practicable to ship to it coking coals from any section within a radius of a favorable freight rate.

3.—Many coals not suitable for coking in bee-hive ovens become available by mixing them with other coals.

4.—Coking coals in by-product ovens permit of the full recovery and use of the valuable by-products and the gas.

5.—The cost of making by-product coke at the iron and steel works is considerably less than the cost of making bee-hive coke at the coal mines and transporting the coke to blast furnaces, especially when located some distance from the bee-hive districts.

6.—The profits thus obtained give a handsome return on the investment in by-product coke plants.

The by-product coke oven is changing the economic geography of the available coal fields for coking purposes in the United States.

This is not the case with the bee-hive ovens, which in most cases are placed near the coal mine that supplies their coal, and when the mine is exhausted the bee-hive plant has to be abandoned. Many coals from large fields will not coke, or will only partially coke, in bee-hive ovens, and the recovery of by-products from bee-hive ovens, while frequently attempted, has almost invariably proved to be an economic failure.

In Germany a number of by-product coke oven plants are built at the collieries and ship coke to the blast furnaces, but conditions are somewhat different in that country and many of the large steel works are located at or near the collieries and thus are able to utilize more directly the surplus gas produced in the by-product oven.

Comparison of Costs

Comparing, for instance, a by-product plant at Gary, Ind., with a bee-hive plant in the Pocahontas, W. Va., district, and taking into consideration the mine investment, houses required for workmen and everything connected with the construction ready for operation of either type, we find that the bee-hive oven installation complete costs more than the by-product for the same number of tons coke produced per year. Comparing the above by-product plant with a similar bee-hive oven installation in the Connellsville region, we find that the cost of a bee-hive oven installation complete is considerably less than the cost of a by-product coke oven installation per ton of coke produced per year, the calculations being based on the price of bee-hive coke delivered in the Chicago district.

A feature of importance in the use of the by-product oven is the greater coke yield obtained in this type than in the bee-hive oven from the same coals. This amounts to 23 to 25 per cent in the low volatile coals, such as Pocahontas, and from 5 to 12 per cent in the high volatile coals, dependent on their original content of volatile matter. This subject is not fully understood and appreciated generally and yet is of vast importance in the conservation of our coal fields. A concrete example will be of interest:

	Pocahontas Coal Coked in	
	Bee-hive coke oven plant.	By-produce coke oven plant.
Number of ovens.....	6,154	560
Coking time	72 hours	17½ hours
Yield of coal to coke, per cent	60	82
Net tons of coal required to produce 2,880,000 tons coke per year..	4,800,000	3,512,000
Net tons of coal saved per year by use of by-product coke ovens for above coke production		1,288,000

This amount of coal saved, if it were coked in by-product ovens, would produce about 1,000,000 tons of coke per year.

Coal Data

As to the use of high or low volatile coals, alone or in mixture, for the purpose of making a good blast furnace coke, our experience has been varied. We started at Joliet making coke from 60 per cent high volatile and 40 per cent low volatile coals, and finally settling on 20 per cent high volatile and 80 per cent low volatile coals. Neither mixture gave us any trouble in the coke ovens, but the 80 per cent low volatile mixture gave a better furnace coke. Later, however, when we understood the operation of the ovens more thoroughly and our oven organization had been taught to do better team work, we found that we could make a first class furnace coke out of 40 per cent high volatile and 60 per cent low volatile coals.

At the Farrell, Pa., by-product plant we are using successfully 60 per cent of high volatile and 40 per cent of low volatile coals. At our Birmingham, Ala., by-product plant we are using a mixture of medium coals, averaging about 29 per cent in volatile matter.

At Wheeling, W. Va., the Semet-Solvay ovens are making coke for the Riverside furnaces of the National Tube Co. from 80 per cent high volatile Connellsville coal and 20 per cent low volatile coal, averaging 32 per cent in volatile matter.

At the Zenith furnace, at Duluth, I have seen some fair looking coke made out of 100 per cent Pittsburgh seam slack, averaging 36 per cent in volatile matter. This was used in a small furnace and it might be a question as to how such coke would work in a large furnace.

There is another factor which, though not yet fully understood, affects the quality of the coke materially, and that is the deterioration in the coking quality of the coal from weathering. We have found that some of our coals, especially the low volatile ones, when exposed to the weather in large stock piles for a certain period of time, will heat and the resultant coke will be rough and almost furry in appearance, seriously affecting the furnace practice. This appears to be the case to a much less degree in high volatile coals. In fact, I have been told that Pittsburgh seam slack, when not crushed too fine, will show but slight effects of weathering after having lain all winter in the stock pile.

The process of preparing coal for coking to get the best quality of coke, involves proper crushing and, if several varieties are used, proper mixing. As a rule, we find that fine crushing, say to 85 per cent of the coal to pass through an ⅛-inch screen, is advisable. The crushing has the effect of breaking up the particles of slate so that they will be intimately mixed with the coal and, therefore, distribute themselves uniformly through the cellular structure of the coke, while any larger pieces of slate in the coke always break the bond of the cellular structure and give more chance for the undue breakage of the coke into small pieces.

The washing of coal for the manufacture of by-product coke is frequently a necessity with some of our Americal coals. In Germany, washing of coal for coking purposes is almost universal. At most of the plants in that country the run-of-mine coal is classified and the screenings are washed for coke oven purposes. As a rule, there is not much sulphur in German coals, which is unlike some of our American coals.

Coal Washing

At Johnstown, Pa., almost from the beginning of operations, the coal has been washed to reduce the ash and sulphur. The Tennessee Coal, Iron & Railroad Co. also washes practically all its coal for coking purposes, ash reduction being the prime factor. The Illinois coals also require washing and, in fact, much of the Illinois fuel for steam and general purposes is rough-washed, the coal being crushed to about 1-inch size for washing.

That many of the coals will be greatly improved by washing or dry clean-

ing, is unquestionable. Even a comparatively low ash coal will, through carelessness in mining or irregularity of coal seam, occasionally run high in ash and possibly sulphur, and washing or dry cleaning will remove such irregularities, giving a more uniform quality of coke and better furnace practice.

That washing is not a new feature in the United States, it may be of interest to state that 21 per cent of all the coal used for coking in this country is washed. In Alabama the greater part of the coal for coking purposes is washed.

Coal Drying

One of the great objections to washing coal at the mines lies in the fact that the present methods of drying the coal demand large and expensive storage bins, and even then are not satisfactory as the coal will still contain a fairly large percentage of moisture. This increases the freight haulage cost from the mine to the coke ovens and in winter can become objectionable through the freezing of the coal, requiring expensive and costly thawing installations. Even where the washing is done at the plant, the amount of water still contained in the coal after being received from the drying bins makes the crushing and mixing more difficult, and the charging of wet coal is detrimental to the oven walls, in all probability also increasing the coking time.

Numerous experiments have been made to dry the coal mechanically and continuously, especially by the centrifugal method, and we believe that we have been able to work out a method at the Joliet plant which promises success, the moisture being reduced to 5 or 6 per cent.

We have found that *when made right,* from many suitable coal mixtures widely varing in volatile contents, by-product coke will give results in the blast furnace equal in every respect to the best of bee-hive coke. It is further true that such by-product coke is preferable to bee-hive coke when the latter has been shipped from different coking operations and thus made from different coals, because the by-product coke, when made from the same coal mixture is more uniform chemically and physically.

The type of oven is not of such prime importance in this respect as the proper operation of the oven and the uniformity of its coal mixture. There are now five or six types of by-product ovens in operation, all of which are good. Some are more simple in construction and operation than others, but all are capable of making a good coke from similar coals, if properly operated. The by-product oven being a more delicate and complicated apparatus than the bee-hive oven naturally requires more care and attention. The coking time must be brought to the lowest practical point. This must be determined by experience. It must then be held there as closely as possible. The pushing must be regular; the temperatures of flues, and hence of the ovens, must be held to conform to the coking time and should be kept uniform. Over-coking is fatal to good coke, tending to make a friable and small material. The pressure exerted in pushing over-coked fuel always tends to produce a larger percentage of small coke than when pushing a normally coked oven. Under-coking is bad, though, in my opinion, perhaps slightly less so than over-coking, tending to the production of lumpy coke, black, soft ends and a softer cellular structure throughout. Increasing the coking time beyond what it should be, has always given us bad results.

Our experience indicates that when it becomes necessary to curtail the production of coke, it is distinctly more profitable to suspend operations on one battery of a plant, keeping it heated with gas, and that the only time we are justified in prolonging the coking time is because of a temporary coal shortage.

The uniformity of the coal mixture has an important bearing on the quality of the coke. Each coal has its own individual characteristics in affecting the quality of the coke. In the case of some coals, this difference is slight and negligible; in the case of most coals, it is marked and distinctive and has probably not been as fully understood or realized as it should be and will be in the future.

A tabulation showing what we consider good physical tests for a standard quality of blast furnace coke is given in Table I.

Table I.

PHYSICAL TESTS OF BLAST FURNACE COKE

Mixture—Coal.	Shatter test. Through 2-in. screen.	Shatter test. On 2-in. screen.	Specific gravity. Apparent.	Specific gravity. True.	Porosity or percentage of cell space.
80 per cent Pocahontas ..... 20 per cent Ronco	15.16	84.84	0.976	1.841	47.03
80 per cent Pocahontas ..... 20 per cent Rend	16.11	83.89	0.950	1.824	47.92
60 per cent Pocahontas ..... 40 per cent Ronco	14.06	85.94	0.992	1.834	46.31

Constructive Features of By-Product Ovens

When the coke committee of the United States Steel Corporation was discussing the construction of the Joliet ovens, the importance of a shorter coking time than that of the German ovens, which then was about 28 to 34 hours, was considered desirable, and this brought up the question of the brick to be used,

The brick largely used in Germany was quartzite. Experiments with silica brick had meanwhile been made by the Semet-Solvay Co. and also by the Cambria Steel Co. After an exhaustive study of this subject, the coke committee recommended constructing No. 1 battery at Joliet of silica brick, the raw material being obtained from the Baraboo district of Wisconsin; No. 2 battery of St. Louis quartzite brick, the raw material being composed of Missouri clays, and Nos. 3 and 4 batteries of quartzite brick obtained from Arloff, Germany.

The average analyses of the different kinds of brick used are given in Table II.

No. 1 battery, the oven walls and flues of which consist of silica brick, has always been the best battery in heat regulation and operation, owing to the ability of the silica brick to transmit the heat better than the quartzite. We believe the battery whose oven walls are constructed of silica brick, will outlast the batteries whose walls are constructed of quartzite brick, both American and German. We have not yet had to reline any of the ovens constructed of silica brick, while we have repaired the ovens constructed of the German and American quartzite brick. The indications also are that we use considerably less gas to get the same coking time with the silica brick than we do with the quartzite brick.

After the construction of the Joliet plant, the consensus of opinion of the coke committee was that all future plants should be built with silica brick, that is, the oven and flue walls, due care being taken to arrange for the necessary expansion.

Regenerative ovens are more advantageous for installation at steel works,

as a larger supply of surplus gas is available through regeneration than through recuperation, and this surplus gas is a valuable asset to the steel plant.

Whether to place the generators under each oven or longitudinally along the whole battery, has been a subject of considerable discussion. I have seen many ovens of the latter type which have given uniform combustion temperatures, but, on the whole, I prefer the type having the regenerators under each oven, as I think it is easier to control the temperatures in such regenerators. Also, in a battery of ovens of this type, operations are not liable to be influenced by other ovens not operating properly or shut down for repairs or other reasons.

Both vertical and horizontal flue systems are in operation in this country. The horizontal flue system ovens are doing good work, and as far as I have been able to observe, the combustion of gas and air in them has been controlled just as completely as in the vertical flue ovens, so that just as uniform temperatures can be attained by either system.

The combustion in, as well as the accessibility to, the vertical flue ovens seems to me to be more easily and better controlled in those types whose flues open to the top of the oven than in those whose flues are only accessible from below or entirely closed in, and the great objection to many of these latter types is that if anything goes wrong at any time with any flue, it is almost impossible to remedy this without stopping the oven and tearing out some brick-work, while this is not necessary in types that open to the top of the oven, or in the horizontal type.

A feature to be studied and watched carefully is the construction of the flue walls to prevent leakage, or short-circuiting of air and products of combustion from one flue to the other. This is usually caused when the oven is heated and expands, and any flue system that is complicated and has more than the absolutely necessary passages upward or alongside the oven walls, subjects itself to danger from this source.

Air Ports and Draught

An important feature is the area of the air ports and flues in which the combustion takes place, as upon it will largely depend the coking time. For a short coking time, plenty of area is required to enable the operator to burn sufficient gas to give him the temperatures he desires. The earlier construction rather erred in this, with the result that frequently there is not quite sufficient draught to give the necessary rapid combustion for high heat. While this can be corrected through increased stack draught or induced draught, yet for new construction it is a problem worthy of careful study. In my opinion, there should be one draught stack to every battery of coke ovens with sufficiently large flue area to take care of atmospheric or other fluctuations.

Advantages of Tapered Ovens

It has been found that a taper of about 4 inches in the width of the oven from the pushing end to the discharging end is of great importance, especially where swelling coals are used, but even where this is not the case, a taper is always of advantage, as thereby less resistance is offered by the walls of the oven to the movement of the coke. After the first effort of putting the coke mass into motion, pushing is made easier, less small coke is produced and the walls of the oven are conserved. Practically all the different coke oven systems now have arranged their heating flues in such a manner that the necessary amount of heat penetrates into the coal mass at the wide end of the oven at the same time as at the narrow end.

The question of the width of oven is important, and to my mind it has by no means been determined that an average of about 19 inches is the limit to which we can go and produce satisfactory coke within a reasonable coking time. In modern systems, the heating arrangement is so flexible that with a wider oven sufficient increased heating can be applied to attain a similar coking time to that in the narrow oven. We built our first ovens for a 24-hour coking period. On the same width of oven we reduced this coking time to 16.5 or 17 hours. At the Birmingham, Ala., ovens the taper was decreased, causing an average increase in width of ¾ inch more than in the Gary ovens. This is for a high volatile coal mixture, and yet the coking time at Birmingham is down to 17.2 hours and undoubtedly will be still further reduced. The coke ovens at Farrell, Pa., with a width of 17 inches and no taper, have a coking time of 20 hours. The Riverside coke ovens, with a 17-inch width, are running on a 20-hour coking time.

The same applies to the use of high volatile coal. It has been claimed that with high volatile coal the coking time would be materially increased; in fact, that the coking time increased in proportion to the width of oven and the higher volatile matter contained in the coal mixture.

I think we are demonstrating today that, with mixtures of 20 per cent, 40 per cent, 60 per cent, 80 per cent and 100 per cent of more or less high volatile coals, we are having practically the same coking time, providing the conditions of heating the oven are sufficiently taken care of to accomplish this.

We have changed our coal mixture at the Joliet and Gary plants from 20 per cent to 40 per cent high volatile coal without any practical change in the coking time. There is no question that we will reach a limit when, with the best of heating arrangements and burning of ample gas, we will arrive at a point where the coking time will become directly proportionate to the width of the ovens. The same may become true of the larger admixture of high volatile coals.

Another problem that we have been working on for some time is coke oven doors. The by-product oven should have a self-sealing door. The present system of clay-luting the doors is expensive as far as labor and material is concerned; it takes considerable time and, if not done properly, causes leakages through variations in pressure which burn up part of the coke and deteriorate the by-products and the gas.

A self-sealing door that is simple, strong, easily adjusted and taken care of and not subject to warping, is a prime necessity.

Number of Ovens in a Battery

As to the number of ovens that can be included in a battery, this is practically a matter of choice and local conditions. We have in most of our plants 70 ovens to a battery, but are building one battery of 92 ovens and in Germany there is one battery of 120 ovens. As long as expansion has been

TABLE II.

AVERAGE ANALYSES OF BRICK USED

Sample.	Loss on ignition. Per cent.	SiO_2 Per cent.	Fe_2O_3 Per cent.	Al_2O_3 Per cent.	CaO Per cent.	MgO Per cent.	K_2O Per cent.
Silica	0.02	94.06	0.87	2.23	2.52	0.15	0.15
St. Louis quartzite.....	0.12	79.29	2.26	16.66	0.49	0.36	0.82
German quartzite	0.11	83.15	1.57	13.19	0.37	0.34	1.17

properly taken care of between individual ovens, no danger should result to a whole battery, regardless of the number of ovens in it. I would, however, hardly think it suitable for our operating conditions to have more than 100 ovens in a battery.

One of the serious problems that confronts by-product coke oven operators is the proper method of quenching and screening the coke, especially on a large scale, when only six minutes are allowed betwen the time of pushing one oven and the next oven to be served by the same screening station, as in a large plant, such as the one at Gary.

At Joliet the quenching bench is directly in front of the oven. A certain amount of water is sprayed over the coke as it is being pushed out of the oven and the mass of coke, after steaming, is watched to note any appearance of red hot coke, which can be quickly quenched by hand with a small hose. This method of quenching permits of three or four charges lying in front of the battery, gives time enough to quench without soaking the coke and insures a reasonable and low moisture content. An objection to this system is the heavy mass of steam formed directly in front of the oven while the coke is being quenched and is steaming off.

Quenching Cars

At most of the other plants in this country various types of quenching cars are used, into which the coke is pushed and then conveyed by motor or locomotive to a quenching station, where water is sprayed over it. After that, different plants handle this coke in different ways. At some plants, the quenching is still done in front of the oven in the car. This is objectionable. Most plants have a separate quenching station away from the ovens; in some the coke is held on these quenching cars long enough to steam-off, and any pieces of red-hot coke are quenched by hand with a small hose.

To hold coke on quenching cars is expensive as it means an extra supply of these rather costly cars and is hardly practicable for a large plant. The system installed at Joliet, on the whole, has worked out very well; but the system adopted at Farrell, of pockets with inclined sides from which the coke is dropped on a belt, seems to me to be efficient and very simple.

At Duluth a different system will be tried. The quenching platform will be away from the end of the ovens, so that the coke can be quenched in the car, then dropped on this platform away from the ovens and the quenching process finished there.

The coke after being quenched is then raised to the screens, either by means of large hoists or belt conveyors. We have had some very good results by using a belt conveyor. If proper precautions are taken in the quenching of the coke, a belt will last a long time. The belt method of elevation permits of a more even distribution of the coke onto the screen than when the whole mass is precipitated out of the large bucket.

Methods of Screening

Proper screening of the coke I consider an absolute necessity, whether this be done on an inclined plate screen or in a rotary screen, and good screening can only be accomplished by feeding the coke gradually onto the inclined screen, or if a rotary screen is used, having it long enough to distribute the mass of coke. Too long a rotary screen is apt to grind the coke at its lower end more than is perhaps necessary, while too short a rotary screen will not permit of the mass of coke, even when coming from a belt, to separate properly, unless the belt feed is made slow enough to prevent any large accumulation of coke on the screen.

At some plants, the coke is not screened at the coke plant, but is carried direct to the blast furnace coke bins and screened as it drops out of the bins. As a rule, this has not been satisfactory because the mass of coke in the bins is too large and the passage over the screens too swift to permit the fine particles to drop through the screens. A good deal of the success in screening also depends on the dryness of the coke as the fine particles of dust will cling to a wet coke and cannot be shaken off.

There is still some difference of opinion among blast furnacemen as to the detrimental effect of coke breeze. To my mind there is no question but that the more free from breeze the coke goes into the blast furnace, especially under our present furnace operating conditions with high percentages of Mesabi ores, the better the results will be. At one plant an experiment was made using unscreened coke in the blast furnaces, which resulted in a material increase of the blast pressure, the furnaces refused to drive and the coke consumption was increased. At most of our plants, the coke dust is used in making bottoms in soaking pits and for other similar purposes.

The screened coke, varying with the handling it receives, is apt to be somewhat irregular in size and experiments are now being made to determine whether it would be advisable to crush the over-size coke, say over 4 inches, to practically 4-inch coke and less, and thus obtain better results in the blast furnace. Many of the furnacemen, accustomed to the use of bee-hive coke in rather large pieces, find it difficult to adjust their practice to small coke, but the physical structure of bee-hive and by-product coke is so different that the experience of those who have so far studied this question inclines one strongly to advise the use of a uniform fairly small coke in furnaces. By-product coke is denser in cellular structure than the average bee-hive coke, and, burning more slowly, the exposure of a large number of surfaces accelerates combustion in the hearth. In addition, it seems that with the large amount of fine ore now used a more even distribution of the fuel in the burden, as it descends in the blast furnace, must be of advantage.

The ideal blast furnace coke bin is one which has no angles flatter than the angle of natural repose of coke and coke dust, and which, therefore, allows no dead material to accumulate and lay inert on the bottom and in corners of pockets. In other words, the bin should be so constructed that all of the coke moves downward toward the chutes, every time the coke is drawn, so that if any coke dust is present, a regular proportion of it will be contained in every skip of coke drawn.

(To be continued)

Fluorspar Production in 1912

The quantity of fluorspar mined in the United States in 1912 was 117,282 short tons, compared with 93,563 short tons mined in 1911, according to an advance statement by the United States geological survey. The quantity of domestic fluorspar reported as marketed in 1912, was 116,545 short tons, valued at $769,163, compared with 87,048 short tons, valued at $611,447, marketed in 1911, an increase in quantity of 29,497 short tons and in value of $157,716. This increase represents nearly 34 per cent of the quantity and nearly 26 per cent of the value of the product marketed in 1911. The production and sales of fluorspar in 1912, were by far the greatest ever recorded. The average price per ton for the whole country on board cars or barges at railroad or water shipping points, considering all grades of fluorspar, gravel, lump, and ground, was approximately $6.60 in 1912, as compared with $7.02 in 1911, a decrease of 42 cents a ton, or nearly 6 per cent.

Fluorspar was produced in 1912 in five states, Illinois, Kentucky, Colorado, New Hampshire, and New Mexico, ranking in the order named.

THE ABC OF IRON AND STEEL

The Manufacture of Open-Hearth Steel—IV

By Kenneth Seaver

IN MAKING steel by the use of ferro-manganese as a recarburizer, the addition of this alloy will be so small that its carbon content will have little effect in raising the carbon of the heat, although it must be taken care of. It is often customary to boil down to 0.08 per cent carbon for soft steel and to bring back to the proper carbon for tapping by adding a pure pig charged on the sides of the hearth, which is allowed to run into the bath. Care should be exercised to insure the proper melting of this metal and it should be thoroughly mixed with the bath. It also may be added in the ladle in the molten state.

Another method of adding carbon, sometimes termed the Darby process, is effected by mixing coal or coke dust in the ladle, approximately 40 to 50 per cent of the carbon so added being absorbed by the metal. The exact amount largely depends on the temperature, hot steel absorbing more than when it is poured at a lower temperature.

When manufacturing high-carbon steel with a carbon content varying from 0.40 to 1 per cent, it is the custom usually to catch the carbon coming down, that is, to stop the refining process at the proper point. The heat often is worked down slightly under the desired carbon content for tapping and is brought back by adding a small amount of pig iron in the furnace or powdered coal in the ladle. The addition of all of the carbon in the ladle to a

CHARGING FLOOR OF A TALBOT TILTING OPEN-HEARTH PLANT. EACH FURNACE HAS A CAPACITY OF 200 TONS

metal that is to contain from 0.30 to 0.40 per cent carbon is seldom attempted, although it is possible to accomplish this.

Coal or coke, when added, is weighed so that each sack will give a definite amount of carbon. Assuming that a 50-ton furnace tapping 100,000 pounds of metal in the ladle and that a carbon content from 0.38 to 0.42 per cent in the ingot is desired, and that the heat has been worked down to 0.10 per cent carbon, then

$$0.42 - 0.10 = 0.32 \text{ to be added;}$$
$$109{,}000 \times 0.32 \text{ per cent} = 348.8.$$

In other words, when tapped from the ladle the steel is to contain 348.8 pounds more carbon than when ready to tap from the furnace.

CHARGING END OF A 60-TON OPEN-HEARTH FURNACE

In the best anthracite coal used for this work, about 44 per cent of its weight is available carbon, in other words, absorbed by the steel, the balance being ash, etc., and the amount lost by combustion; therefore,

348.8 pounds equal 44 per cent.
100 per cent equal 790 pounds.

Therefore, there would be added in the ladle approximately 800 pounds of the crushed coal.

When the heat is ready to tap, a bar is driven through the tap hole and it is enlarged from the charging side by a long bar until the slag or metal flows freely. If the hole is properly cleaned at the end of each heat, little trouble will be experienced from hard tap holes, but if portions of slag and metal remain, they will freeze and it will be difficult to sledge them away, as the bar used for drilling softens from the intense heat before much progress can be made.

Although the stock may be amply low in sulphur, there is a possibility of such absorption from the gas if sulphurous coal is used and from the ore, if it is high in this element, thereby increasing the sulphur beyond allowable limits. With the same coal, however, varying amounts of sulphur may be absorbed, for instance, when the furnace works cold the bath is subjected for a much longer period to the action of the gases and sulphur is much more readily absorbed. The addition of small amounts of lime with the coal in the producer may have a tendency to fix the sulphur in the ash, but this addition, unless made carefully, causes the coal to clinker.

In acid practice, only a few samples ordinarily are necessary, these being dipped with a spoon from the bath, poured into a mold, quenched and broken. From the appearance of the fracture the carbon is estimated, a good melter usually coming within two or three points or one-hundredths of 1 per cent, in carbon of 0.20 per cent or under. With a higher percentage of carbon there is a greater liability of error. The first sample sometimes is taken shortly after melting, and the melter then knowing with what carbon he has to deal, works down the bath to a point which he

judges to be a little above the required carbon and then takes another sample. When the heat is ready to tap a third sample may be taken and the fracture test is checked by a rapid analysis in the laboratory which requires not over 10 minutes. The temperature of the furnace and the metal is determined largely by the eye. Stirring by iron bars gives a good indication from the *feel* of the metal whether it is liquid or viscous and from the way the bar is melted off. If the portion of the bar melted off is clean cut, the temperature of the bath is high and if the end of the bar is rounded, the bath temperature will be somewhat lower.

As previously noted, in the basic furnace the carbon, silicon, manganese, sulphur and phosphorus are removed or reduced and as distinguished from the acid process, the sulphur and phosphorus, in a great measure are under control. Therefore, stock unsuited for acid practice remains available for the basic. In this country there are vast bodies of low phosphorus ores which yield pig iron too high in phosphorus for the acid open-hearth and too low for the basic Bessemer process, but which can be used to advantage in the basic open-hearth. The general methods employed in basic practice are identical with those of acid practice and the only material departure from the latter in basic operations consists of the addition of lime with its consequent basic slag.

Under the oxidizing influences of the flame and ore the phosphorus is oxidized to phosphoric acid, $2P + 5O = P_2O_5$, which in turn, in the presence of lime, unites to form a sulphate of lime, which is practically stable under normal basic open-hearth conditions, that is, where the slag is maintained strictly basic. However, under certain conditions, part of the phosphorus may easily return to the bath if the proper precautions are not observed.

Sulphur is removed partly in the slag as sulphate of calcium, CaS, by a manganese ore which may be added and by metallic manganese, with the formation of manganese sulphide, MnS. Another method is the so-called *Saniter* process, which is dependent upon the use of an oxychloride of lime.

Lime may be used in either the natural state of limestone, $CaCO_3$, plus its impurities, or in its calcined form, CaO, from which the carbonic acid gas has been driven. The use of limestone with its calcination in the open-hearth and the consequent liberation of CO_2 serves to make the bath boil and insures a lively reaction and the mingling of its elements. Carbon dioxide gas also acts as an oxidizing agent and under these conditions allows a larger quantity of pig to be used with a correspondingly large amount of metalloids to be oxidized. This oxidation involves the following reactions:

Carbon: $C + CO_2 = 2CO$.
Silicon: $Si + 2CO_2 = 2CO + SiO_2$.
Manganese: $Mn + CO_2 = CO + MnO$.

(*To be continued.*)

CASTING FLOOR OF STATIONARY TYPE OPEN-HEARTH FURNACES IN A STEEL FOUNDRY

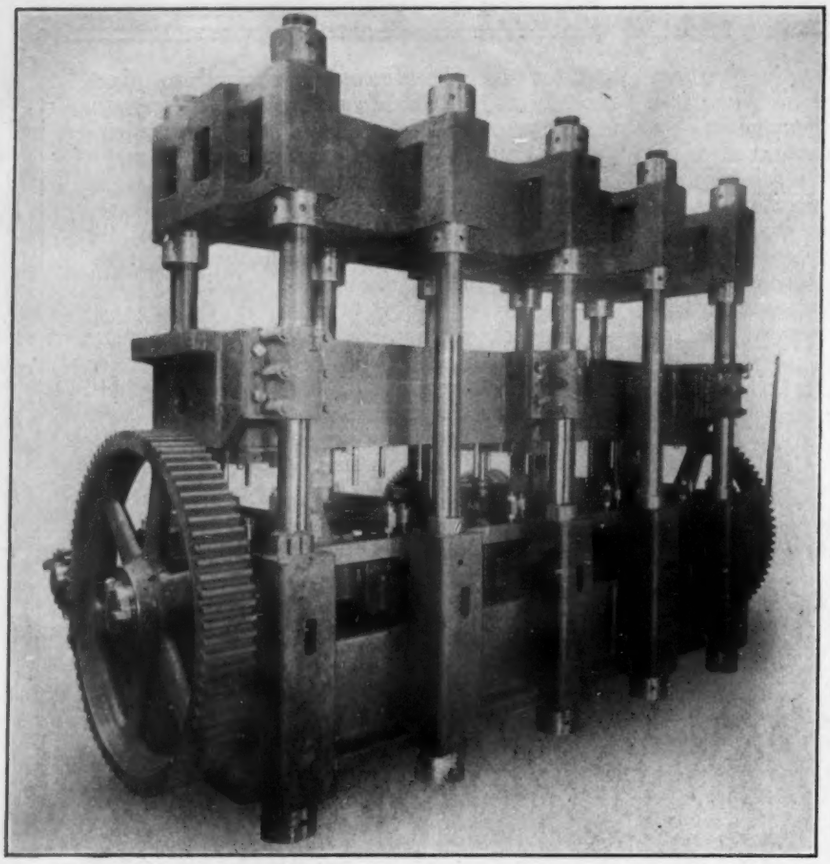


FIG. 1—FRONT VIEW OF LARGE PRESS DESIGNED TO FORM AUTOMOBILE SIDE FRAMES

Automobile Side Frame Press

One of the largest automobile builders of France recently had designed and built by the E. W. Bliss Co., Brooklyn, a new type of large capacity press for forming automobile side frames. This press is the largest machine of its type yet built and represents a new design which has been developed and is now being exclusively built by the Bliss company. The moving table is 3 feet wide and 18 feet long. The machine has a capacity for forming side frames from ¼ inch chrome nickel steel in lengths up to 18 feet. The moving table is raised by four solid connecting rods which are fitted to the crankshaft. These connecting rods are equally spaced throughout the length of the table. The lubrication of the connections is effected by a high pressure oil pump mounted on the back of the moving table, as illustrated in Fig. 2. Adjustment for depth of drawing is provided by the nuts holding the upper head. The distance between the moving table, when up, to the bottom of the upper head, is 32 inches, and the upper head has an adjustment of 22 inches.

Owing to the stress to which the upper head, moving table and gearing are subjected these parts are made of cast steel. The gearing is machine cut. The machine is twin-driven, in that it is provided with a gear on each end of the crankshaft. The driving gear which imparts power to the main gears is placed centrally, overcoming all torsional strain on the main back shaft. Control of the machine is by a powerful, double-grip friction clutch, operated by hand. This gives the operator complete control of the moving parts at any point of the upward and downward movement. The driving pulley as well as the flywheel is provided with a shearing pin. This prevents damaging the press, when through carelessness or otherwise a wrench, bar, or some other article is left on the top of the die or when the press is not adjusted properly as regards the height of dies. A series of holes in the moving table permits the knockout pins to be placed in the proper position to eject the formed work. The total weight of machine illustrated is 300,000 pounds, and the power required to operate it at its maximum capacity is 75 horsepower.

The production of lead in the United States in 1912 was 480,894 short tons. The total refined lead output was less than that of 1911, by 6,085 tons, a decrease of 1.2 per cent. Missouri had the greatest output, 162,610 tons, a decrease of about 20,000 from the previous year. Idaho was next with 127,707 tons, a gain of about 10,000 tons over 1911.

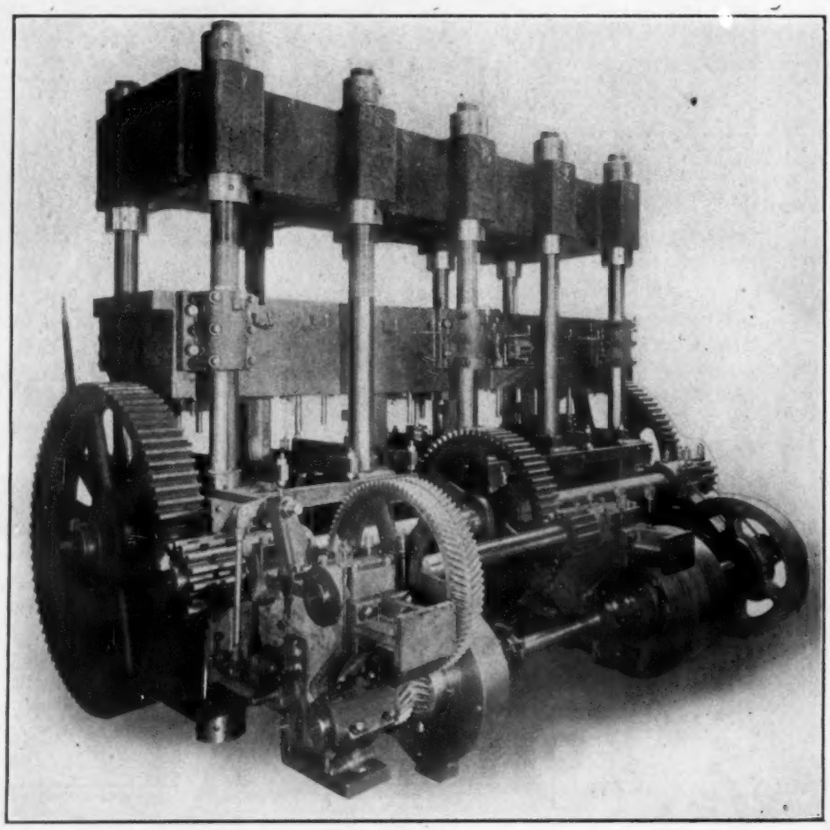


FIG. 2—REAR VIEW OF LARGE PRESS, SHOWING SYSTEM OF LUBRICATION

The Microscope in the Iron and Steel Industry[1]

The Practical Value of This Instrument for Diagnosing the Anatomy of Metals, With Numerous Interesting Examples

By Albert Sauveur[2]

In the early days of iron and steel-making some rough tests were applied to the finished or semi-finished articles in order to ascertain their physical properties, that is, their strength or weakness, ductility or brittleness, hardness or softness, and the early metallurgist had to be satisfied with these crude means of estimating the quality of his products. The mechanical tests have been gradually improved until today the strength, ductility, elasticity, hardness, resistance to wear, to shocks, to repeated stresses, to alternate stresses, etc., can be measured with great precision and the results yielded by these highly developed testing methods are of the greatest value to the producer and consumer as well as to the engineer. No matter how refined the method of physical testing, however, and no matter how great its accuracy the information it conveys while very illuminating in indicating whether or not a certain steel is suitable for a certain purpose or whether it is better than another steel, it rarely enlightens us as to the manufacturing modifications needed to produce the desired results, and rarely points unmistakably to the factor or factors responsible for failure. Whatever it can do for us in these directions is done in an indirect, empirical way.

After the admittance of the chemist, reluctant at first and relatively recent, into iron and steel works, the knowledge supplied by him of the ultimate chemical composition of the raw materials and products proved of inestimable value to all concerned, until today the manufacture of iron and steel without his assistance is hardly conceivable. It soon became apparent, however, that the physical properties of iron and steel articles could not be safely predicated from a knowledge of their ultimate composition, and that chemical analysis, therefore, also had its limitations in instructing us as to what to use and what to do to produce certain results. That two pieces of steel may have exactly the same chemical composition and still vary greatly in physical properties is a fact now so universally known that its statement is superfluous. And we have come to realize that this lack of closeness in the relation between the ultimate composition of a substance and its physical properties is not confined to iron and steel but on the contrary is a very common, not to say universal, occurrence. The chief reason for this is evidently to be found in the consideration that although two pieces of steel, for instance, may contain the same elements in exactly the same proportions, those elements may form unlike combinations in both pieces. In other words, while the ultimate composition of both pieces may be identical they may differ in proximate composition.

ALBERT SAUVEUR

Clearly, a much closer relation must exist between the properties of a substance and its proximate composition than between those properties and its ultimate composition. Unfortunately, as I have previously expressed it, chemistry generally throws but little or no light upon the proximate composition of bodies, that is, upon what may be termed the anatomy of matter. Its very methods which call for the destruction of the physical structure of matter show under what difficulties the analytical chemist labors when attempting to obtain information as to proximate composition.

Metallography on the contrary lifts the veil hiding from view the proximate composition of metals. To exemplify, Figs. 1, 2 and 3 show three pieces of steel which we may reasonably assume to have been reported by the chemist as having exactly the same ultimate composition, that is, as containing the same percentages of

[1]From a paper presented at the annual meeting of the American Iron and Steel Institute.

[2]Professor of metallurgy and metallography, Harvard university.

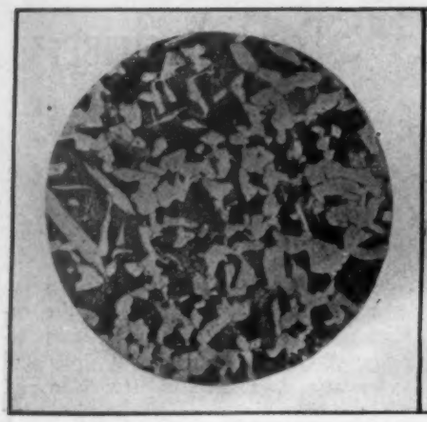


FIG. 1—STEEL CONTAINING 0.50 PER CENT CARBON, HEATED TO 1,000 DEGREES CENT., AND SLOWLY COOLED IN FURNACE
(Magnified 100 diameters, ferro-pearlitic structure)

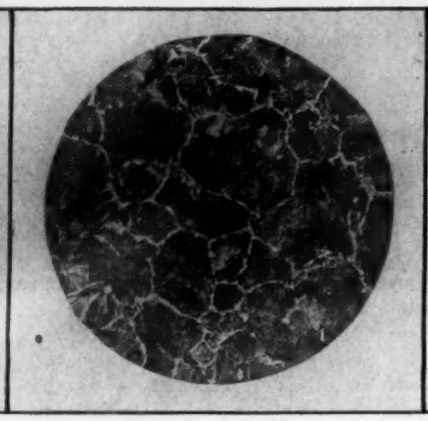


FIG. 2—STEEL CONTAINING 0.50 PER CENT CARBON, HEATED TO 1,000 DEGREES CENT., AND COOLED IN THE AIR
(Magnified 100 diameters, ferro-sorbitic structure)

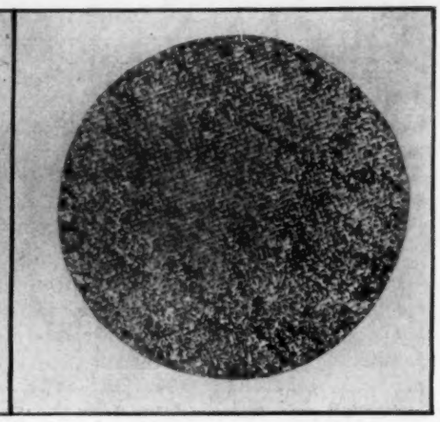


FIG. 3—STEEL CONTAINING 0.50 PER CENT CARBON, HEATED ABOVE CRITICAL RANGE AND QUENCHED IN WATER
(Magnified 100 diameters, martensitic structure)

carbon, silicon, sulphur, phosphorus and manganese. The steel represented by Fig. 1, however, may have a tensile strength of some 100,000 pounds per square inch, an elongation of 20 per cent and a hardness resembling that of calcite; the steel of Fig. 2, a tensile strength of 125,000 pounds per square inch, an elongation of 12 per cent, a hardness like that of apatite, while the steel of Fig. 3, may have a tensile strength of 110,000 pounds per square inch, practically no elongation and a hardness approaching that of quartz.

Evidently we have here three pieces of steel which, although of identical ultimate composition, are so unlike in properties as to suggest three radically different substances. To the metallographist, however, those unlike properties are not a source of surprise; indeed he would have predicted them from the unlike structural appearance of the samples suggesting unlike proximite composition. A brief description of these structures and of their teaching may not be without interest.

Steel Structures

Fig. 1 shows the structure of steel containing 0.50 per cent carbon after slow cooling from a temperature exceeding 800 degrees Cent. Ignoring the presence of the ordinary impurities, such steel is made up of about 40 per cent of free iron, called ferrite by the metallographist—the white constituent in the illustration—and of 60 per cent of pearlite, the dark constituent. Under higher magnification, Fig. 4, this constituent which at first appeared amorphous is found to be made up of parallel plates alternately dark and bright, which we know to consist, respectively, of ferrite and of the carbide Fe_3C, the cement carbon of the chemist, called cementite by the metallographist. The hardness of cementite approaches that of quartz; while ferrite, of course, is relatively soft. The mechanical mixture of ferrite and cementite known as pearlite, illustrated in Fig. 4, has a hardness resembling that of feldspar, a tensile strength of some 125,000 pounds per square inch and an elongation of 10 per cent. Assuming the strength of ferrite carbonless iron to be 50,000 pounds per square inch and its elongation 40 per cent, the strength and ductility of any steel made up of ferrite and pearlite may be readily calculated by using the following formula:

$$T = 50{,}000 + 90{,}000\ C$$
$$D = 40 - 36\ C$$

T represents the tensile strength in pounds per square inch, D the ductility expressed in percentage of elongation in two inches, and C the percentage of carbon. These formulae would give for a slowly cooled steel

FIG. 4—STEEL CONTAINING 0.50 PER CENT CARBON, HEATED TO 100 DEGREES CENT. AND SLOWLY COOLED IN FURNACE
(Magnified 670 diameters. ferro-pearlitic structure)

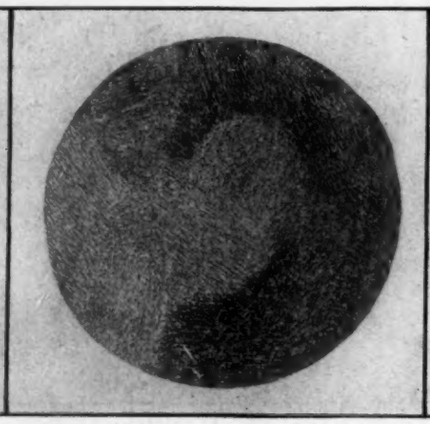


FIG. 5—STEEL CONTAINING 0.89 PER CENT CARBON, SLOWLY COOLED FROM ABOVE CRITICAL POINT
(Pearlitic structure)

FIG. 6—STEEL CONTAINING 0.85 PER CENT CARBON, SLOWLY COOLED FROM ABOVE CRITICAL POINT
(Magnified 750 diameters, pearlitic structure)

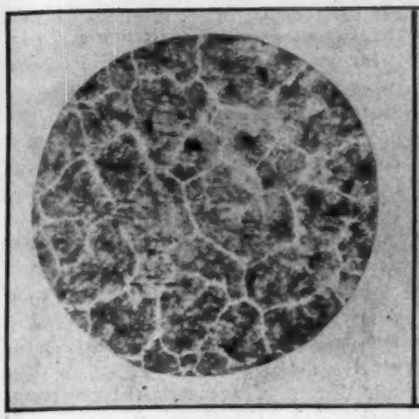


FIG. 7—STEEL CONTAINING 1.10 PER CENT CARBON, SLOWLY COOLED FROM ABOVE CRITICAL RANGE

(Magnified 100 diameters, cemento-pearlitic structure)

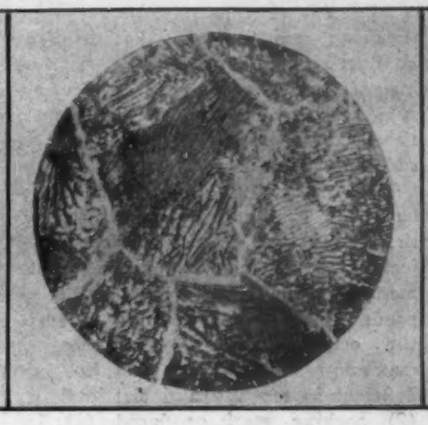


FIG. 8—STEEL CONTAINING 1.43 PER CENT CARBON, SLOWLY COOLED FROM ABOVE CRITICAL RANGE

(Magnified 500 diameters, cemento-pearlitic structure)

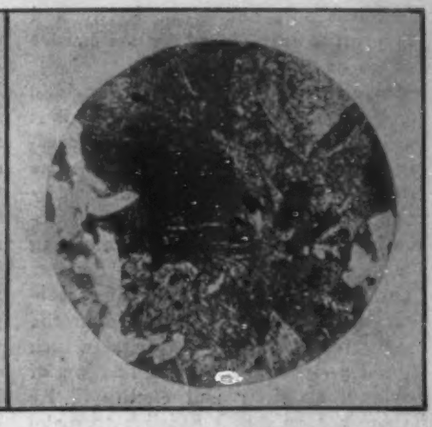


FIG. 9—STEEL CONTAINING 0.80 PER CENT. CARBON, HEATED TO 1,000 DEGREES CENT., AND COOLED IN AIR

(Magnified 500 diameters, ferro-sorbitic structure)

containing 0.50 per cent carbon a tensile strength of 95,000 pounds per square inch and an elongation in 2 inches of 22 per cent.

It will be seen that the strengthening and hardening influences of carbon are readily explained by the microscope, for it is obvious that the more carbon in the steel the more cementite formed, which in turn means the more tenacious and hard pearlite and, therefore, the less weak and soft ferrite. Pearlite makes for strength and hardness, ferrite for softness and ductility and it is by varying the relative proportions of these two constituents of slowly-cooled steel that innumerable grades of steel can be produced varying in strength, ductility and hardness. When steel contains some 0.85 per cent carbon, Figs. 5 and 6, it is entirely made up, after slow cooling, of pearlite and is then of maximum strength, further addition of carbon causing the formation of free cementite, Figs. 7 and 8, and the weakening of the steel, while the hardness continues to increase and the ductility to decrease. Steel made up wholly of pearlite is now very generally known as eutectoid steel, while steels containing some free ferrite or some free cementite are called, respectively, hypo-eutectoid and hyper-eutectoid steels.

Difference in Structure

The structure shown in Fig. 2 will be seen to differ in a marked degree from that of Fig. 1. The light constituent is still free ferrite, but it should be noted that much less of it is present. While in its pearlitic condition, Fig. 1, the steel under discussion contains 40 per cent of free ferrite, in the condition represented by Fig. 2 it contains only about 20 per cent of that constituent. The dark constituent of Fig. 2, moreover, which at first sight might be inferred to be pearlite, when more highly magnified, Fig. 9, is found to lack the characteristic feature of pearlite, namely, the well-defined laminated appearance, presenting instead a granular, ill-defined, nearly amorphous structure. This constituent is called sorbite. Sorbite is decidedly more tenacious, has greater elastic limit, greater hardness and less ductility than pearlite. It is produced by cooling small steel bars in air or larger pieces in oil. Forged and rolled small steel objects are often sorbitic or at least partly so when allowed to cool in air after the last blow or the last pass while larger sections, rails for example, may be made sorbitic by hastening their cooling by the use of water or otherwise.

There are two evident reasons why sorbitic hypo-eutectoid steel has greater strength, elastic limit and hardness and less ductility than pearlitic steel of same carbon content: (1) it con-

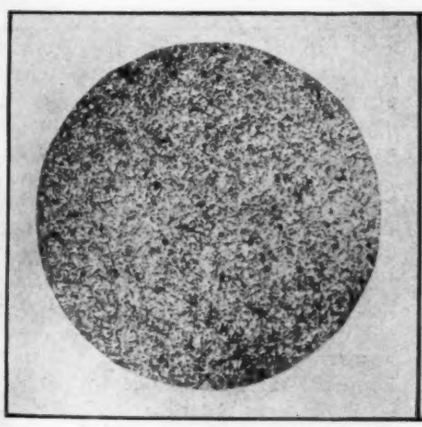


FIG. 10—STEEL CONTAINING 0.50 PER CENT CARBON, HEATED TO 825 DEGREES CENT., QUENCHED IN OIL. REHEATED TO 650 DEGREES CENT., AND QUENCHED IN OIL

(Magnified 100 diameters, sorbitic structure)

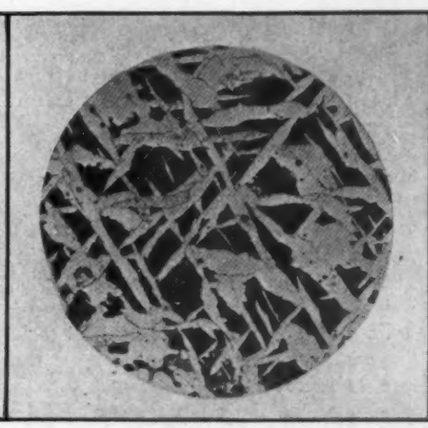


FIG. 11—CAST STEEL CONTAINING 0.50 PER CENT CARBON

(Magnified 100 diameters, ferro-pearlitic structure)

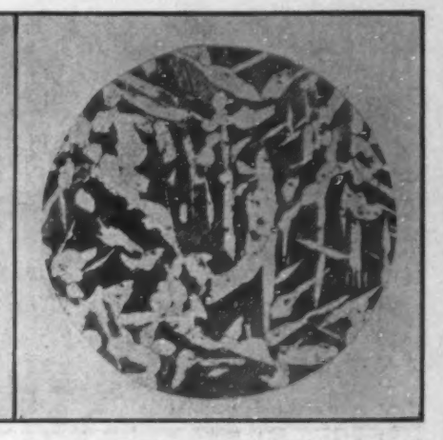


FIG. 12—STEEL CONTAINING 0.50 PER CENT CARBON, HEATED 2 HOURS AT 1,150 DEGREES CENT., SLOWLY COOLED IN FURNACE

(Magnified 100 diameters, ferro-pearlitic structure)

tains less soft and weak ferrite and (2) pearlite is replaced by the harder and more tenacious sorbite.

Sorbite, and, therefore, sorbitic steel, may also be produced by first hardening the steel, that is, by cooling it very quickly from above its critical range, as, for instance, by quenching it in water and then reheating it to a temperature exceeding 400 degrees, but below 700 degrees Cent. This method of producing sorbitic steel is now widely used in the heat treatment of forgings which should possess a high combination of tenacity, elasticity and ductility. By its use not only is it possible to make the steel sorbitic, but the very fine structure resulting from the first quenching is retained while hypo-eutectoid, medium high carbon steels remain, moreover, free from soft and weak ferrite.

This is shown in Fig. 10, which illustrates the structure obtained by quenching in oil, steel containing some 0.50 per cent carbon from a temperature slightly exceeding its critical range, reheating it to 650 degrees Cent. and again quenching in oil. The first treatment is for the purpose of refining the grain (through the formation of fine martensite), the second for the purpose of toughening through the transformation of the hard, brittle martensite into fine-grained, tough and tenacious sorbite. It is well known that the toughness so essential in the back of armor plates is obtained by the double treatment just described.

In Fig. 3 the same steel is shown in its hardened condition. It now contains but one constituent, called martensite, which we know to be brittle, extremely hard and deprived of ductility. Steel in its martensitic condition is suitable only for purposes requiring great hardness, but little or no ductility, as for cutting tools, for instance, or for parts of machinery subjected to severe wear, but not to shocks or other suddenly-applied or suddenly-reversed stresses.

To sum up, in Figs. 1, 2 and 3 we have the characteristic structures of the same steel which has been subjected to three well-defined treatments, namely: (1) pearlitic steel produced by slow cooling through the critical range and possessing maximum softness and ductility, but deficient in tenacity and elastic limit; (2) sorbitic steel produced (a) by hastening the cooling through the critical range or (b) by first hardening the steel and then reheating it to above 400 but below 700 Cent., more tenacious and harder but less ductile than pearlitic steel and (c) martensitic steel, produced by very rapid cooling from a temperature exceeding the critical point, hard, brittle and deprived of ductility. While these three typical structures with their corresponding characteristic properties are obtained by sharply-defined and well-understood treatments, it will be obvious that the steel may be subjected to intermediate treatments and that these should yield intermediate structures and properties. In other words, we readily conceive the production of pearlito-sorbitic and of sorbito-martensitic steels having properties intermediate on the one hand between pearlitic and sorbitic steels, and on the other between sorbitic and martensitic steels. As a matter of fact, so sensitive is steel to heat treatment that innumerable structural conditions may be produced, binding together through a gradual transformation forming an unbroken chain the pearlitic with the sorbitic steels and the latter with the martensitic steels.

In what precedes I hope to have succeeded in demonstrating the very loose relation existing between the properties of steel and its ultimate composition, its carbon content for instance, and the much closer relation between these properties and the proximate composition of the metal as revealed by the microscope. From a knowledge of the proportions of pearlite, sorbite, martensite, free ferrite and free cementite present in the steel we are able to foretell with a fair degree of accuracy the treatment received by the metal as well as its physical properties while a knowledge of the percentage of carbon does not convey any information as to the treatment received and enables us only to infer what the properties of the metal might be after certain industrial treatments.

While the proximate composition of steel, or what we may call its structural composition, bears a much closer relation than its ultimate composition to its physical properties, I now propose to show that even from a knowledge of the structural composition we cannot predict the physical properties with absolute certainty. In other words, two pieces of steel may have the same structural composition—let us say the same proportion of ferrite and pearlite—and still differ materially as to certain of their properties. The difference will not be of the same magnitude as that existing between pearlitic and sorbitic steel, but it may be, nevertheless, sufficient to greatly affect the engineering value of the steel. There must be then another factor which influences the properties and which I have not yet considered. Who does not

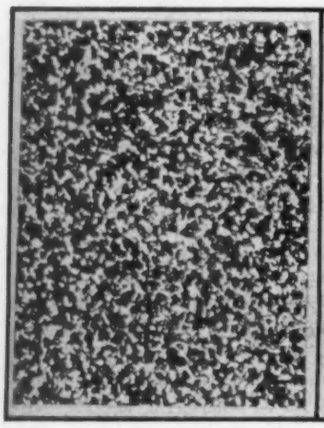


FIG. 13—STEEL CONTAINING 0.50 PER CENT CARBON, HEATED TO 800 DEGREES CENT., SLOWLY COOLED IN FURNACE

(Magnified 100 diameters, ferro-pearlitic structure)

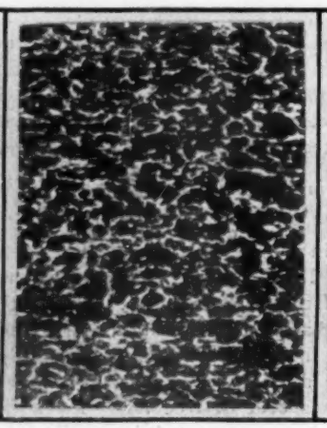


FIG. 14—STEEL CONTAINING 0.50 PER CENT CARBON, COLD-WORKED

(Magnified 100 diameters, distorted ferro-sorbitic structure)

FIG. 15—GRAY CAST IRON FREE FROM COMBINED CARBON

(Magnified 100 diameters, ferro-graphitic structure)

FIG. 16 — MALLEABLE CAST IRON, FREE FROM COMBINED CARBON

(Magnified 100 diameters, ferro-graphitic structure)

know that the properties, let us say the strength and ductility, of a chemically pure metal, are not always the same? Take copper, for instance—chemically pure copper—its tenacity varies greatly according to the conditions in which we test it, that is, whether in the cast, cold-drawn or annealed condition. And still its proximate as well as its ultimate composition necessarily remain unchanged. The explanation for these marked variations of properties corresponding to identical proximate composition is found in the consideration that metals are crystalline substances and that their properties are affected by the dimensions and form assumed by the crystals or crystalline grains of which they are constituted. Generally speaking, it is true to say that the smaller the crystalline grains the more ductile and less brittle the metal and that a grain distorted (elongated) by cold working generally increases the elastic limit and often the tenacity, while it decreases the ductility.

When dealing with steel, therefore, it is not sufficient to inquire into the kind and percentages of the structural constituents; we must also consider the grain of the metal, that is, the dimensions and forms assumed by those constituents. Fortunately, here again the microscope comes to our assistance for it does more than reveal the structural composition of metals, it is a true dissecting instrument which lays bare their anatomy, that is, the physical grouping of the constituents, their distribution, relative dimensions, etc. In Figs. 11, 12, 13 and 14, for instance, we see the structure of four samples of steel having the same structural composition, that is, the same percentages of ferrite and pearlite, and still these metals differ considerably in properties. Clearly because of the different arrangement and dimensions of the particles or grains of ferrite and pearlite of which they are composed. Fig. 11 shows the structure in its cast condition of steel containing 0.50 per cent carbon; slow and undisturbed cooling from the molten condition has resulted in the formation of very large and coarse ferrite and pearlite particles causing the metal to be weak and to be lacking in ductility.

Effect of Forging the Steel

Fig. 12 shows the structure of a similar steel forged, heated to 1,150 degrees Cent., kept at that temperature for two hours and slowly cooled with the furnace. The slow cooling through its critical point has made it pearlitic while long exposure at a high temperature has coarsened its structure, both the free ferrite and the pearlite areas being of considerable dimension. So coarse a structure decreases the strength and ductility. In Fig. 13 we see the structure of the same steel after heating slightly above the critical range immediately followed by slow cooling. The steel is pearlitic, but has a much finer structure, hence greater strength and ductility. Fig. 14 shows a similar steel, the grains of which have been elongated by cold working. This distortion has greatly increased the elastic limit and greatly decreased the ductility. Hot working likewise while not changing the structural composition, greatly affects the size of the grains according to the temperature at which work ceases. Hence the importance of proper finishing temperatures.

The great difference between the properties of gray cast iron and those of malleable cast iron affords a striking example of the influence exerted by the form and mode of distribution of the constituents, for both those metals may have conceivably the same structural composition, that is, they may be made up of the same percentages of ferrite and graphite. In gray cast iron, Fig. 15, the graphite occurs in sharp, curved, irregular plates so thoroughly breaking up the continuity of the soft, ductile ferrite as to greatly weaken it and destroy its ductility, while in malleable castings the graphite occurs as rounded particles, Fig. 16, and in this form is much less harmful, the ferrite retaining considerably more of its tenacity and ductility, or malleability as this relatively small amount of ductility is wrongly called.

Discussion by J. S. Unger

In discussing Prof. Sauveur's paper, I am reminded of my first efforts to use the miscroscope in the examination of steel, about 19 years ago.

Very little had been written on the subject at that time, as metallography was then in its infancy. I believed that the miscroscope would supply the missing link between the chemical composition and the physical properties of some steels which had shown erratic results. I must confess that I was disappointed.

Many works have installed a metallographic laboratory without knowing fully what might be accomplished by its use, but with the belief that they might, accidentally or otherwise, discover something which might prove of value. It cannot be denied that it is a valuable aid in the study of metals when used in conjunction with chemical, physical and other tests. The study of metallography by the student will quickly give him an idea of the structure of metals and the changes that accompany a change in composition, heat-treatment or mechanical manipulation.

A survey of the majority of the articles printed in the books and journals will show that too much space is devoted to a description of apparatus, or to discussion of some theory, losing sight of the fact that the real value of metallography depends on its intense practical application.

Among the practical applications of the microscope in metallography, the following may be mentioned: It will show spots, streaks, highly segregated areas, slag and small cavities, the combined and graphitic carbon in cast iron, how well cast iron has been changed to malleable iron, whether castings have been over, under or properly annealed, and whether a piece of steel has been worked at a high heat. It will show the approximate carbon content of a piece of ordinary steel which has been permitted to cool from a bright red heat in the air, the direction of rolling, the distortion of structure due to cold rolling or drawing, the slippage of crystals in a tensile, bending, torsion or vibratory test, and whether a good weld has been made. If the heat treatment of a piece of steel has been of simple character, it will show what has been done and approximately what temperatures have been used, if the composition is known. It will show the depth of chill in chilled cast iron castings, the depth of cementation or case-hardening, whether the surface has been pigged or whether decarbonized, if a high carbon steel has been hardened throughout, if the surface shows small fissures and the proper temperature has been employed to obtain the best results.

The microscope is of value in determining when an eutetic alloy is formed in brasses, bronzes and white

(*Continued on page* 1318)

THE IRON TRADE REVIEW

DEVOTED TO THE IRON, STEEL, MACHINERY AND FOUNDRY INDUSTRIES

Published Every Thursday by

The Penton Publishing Company

CLEVELAND

BOSTON	201 Devonshire Street
CHICAGO	1521-23 Lytton Bldg.
CINCINNATI	503 Mercantile Library Bldg.
NEW YORK	503-04 West St. Bldg.
PHILADELPHIA	611 Bulletin Bldg.
PITTSBURGH	2148-49 Oliver Bldg.
WASHINGTON, D. C.	501 Metropolitan Bank Bldg.
BIRMINGHAM, ENG.	Princes Chambers

Copies published three months or more previous to date of current issue, 25 cents each.

All communications relating to changes of advertising copy, discontinuances, etc., must be received ten days prior to the next publishing date.

Subscription, United States and Mexico $4.00 per year.
Canada $5.50 and other Foreign Countries $8.00 a year.

Entered at the Postoffice at Cleveland as Second Class Matter.

Copyright 1913, by the Penton Publishing Co.

Cleveland, June 5, 1913

Personality in Business

When James A. Farrell stepped down from the witness stand in the government suit for the dissolution of the Steel Corporation, there was scarcely a man in the steel industry, or outside of it, who had followed the unfolding of his testimony, who did not feel very strongly that the side of the defense had been greatly benefited.

His firm grasp of the most minute details of the giant corporation, over whose affairs he exercises so much direction, was a revelation to the general public, even to many in the steel trade. Only those who have been most intimately associated with him and know him as a man of indefatigable energy and a student of the keenest penetration, were not surprised by this display of remarkable capacity. There is probably no harder working manager, big or little, in the steel industry, than Mr. Farrell. He has been trained in the school of unremitting toil and his high position today is the logical fruit of his energy intelligently applied.

But it was not so much what Mr. Farrell said, though his testimony was given with evident sincerity and conviction, as how he said it, that proved his great value to the defense. His personality diffused itself through every sentence. He met the ordeal of a rigid cross-examination by most skillful counsel with a directness and aptness of answer which left little opportunity for further construction to be placed upon his original statements. The recital of his rise from a lowly position, modestly told, was romance even to the prosecuting counsel. Through the trying experience, for he was upon the stand actually for 43 hours, he showed at no time the irritability and impatience that might be expected of many men under similar circumstances. No witness in the steel suit has received more evidence of respect or of courteous consideration from the government's attorneys, and no one was more worthy of it than Mr. Farrell.

It has often been remarked that Mr. Farrell is a very human man. This quality displayed itself clearly in his testimony. It tended to emphasize what over all else seems to be Mr. Farrell's most prominent possession—his personality. The value of personality never demonstrated itself more clearly than in the appearance of the Steel Corporation president as the defender of the business organization of which he is a part. Soundness of character has and ever will be the most essential factor of the permanent success of any enterprise. The example of James A. Farrell is curiously at odds with the not uncommon belief that the development of personal individuality in business is retarded as the size of the corporation increases.

The Roosevelt Vindication

Every American rejoices in the vindication of Theodore Roosevelt. No American worthy of the name would have been pleased if an ex-president of the United States had been found guilty of the charges made by Editor Newett, of *Iron Ore*. Men of the iron trade sincerely regretted that anyone even indirectly connected with the iron ore industry was the accuser, and because Mr. Newett was the man who published the libelous article, they have special reason for rejoicing in the fact that when convinced that he was in error, his conduct was highly honorable. Nobody who knows George Newett would expect anything less than the manly apology which he made. Mr. Newett is an able man and has had a long and honorable career. The publication of the article which resulted in the suit was an error of judgment, a very serious error, it is true, but not more culpable than the scandal mongering in which many others have engaged. The suit ought to be a lesson to all men to control their tongues as well as their pens.

Hobson's Panacea

At last a remedy for price fluctuations and industrial depressions has been discovered. The troubles which have beset the markets for innumerable years are to pass away.

Who is the discoverer? Is he a man who has had long experience in mining or manufacturing or selling iron and steel products? Not at all. The savior

of the iron market is none other than the hero of the attempt to block the passage to Santiago harbor, a man who a year or so ago predicted that the United States would be at war with Japan in 90 days. He is a congressman who, in the congressional directory says that his name is Richmond Pearson Hobson, that he is a naval architect, a lecturer, and is tenth in descent from Elder Brewster, of the Mayflower.

Now what does Mr. Hobson propose? The bill which he has just introduced in the House of Representatives is so short and remarkable that we publish it in full as follows:

A BILL

To prevent violent fluctuation in the price of construction materials and thereby aid in preventing industrial depressions.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That when at any time the market price of pig iron or of any article of construction material of iron or steel in Schedule C shall exceed by fifty per centum the market price of the same pig iron or article of construction material of iron or steel on January first, nineteen hundred and fourteen, then said pig iron or article of construction material of iron or steel and all materials entering into the manufacture of same shall be transferred automatically to the free list and remain upon the free list until the market price shall again reach the said limit of fifty per centum excess, when the pig iron or article of construction material of iron or steel shall return automatically to its original dutiable status, as provided for in this bill; and the Secretary of the Treasury is hereby authorized to interpret the question of what constitutes market value and what constitutes pig iron and articles of construction or iron or steel and material entering into the manufacture of same as used in this paragraph.

We should like to ask the Honorable Richmond Pearson Hobson a few questions. Is there any reason under the sun why Jan. 1, 1914, should be taken as the date to obtain a basis for fixing the price of pig iron and all iron and steel products? Can anyone possibly tell whether on that date pig iron will be very high or very low? If the price should be low, as the new year dawns, would it be fair to say that the price should never go to a point 50 per cent higher? If, for example, the price of No. 2 foundry at Birmingham, Alabama, the state of Mr. Hobson, should be $10 on Jan. 1, would it be fair to say that, if the price goes to $15, pig iron should for that reason go on the free list? If, on the other hand, on Jan. 1 the price of pig iron should be $20, the provision of the Hobson bill would be that it should never exceed $30 without putting the iron on the free list. Is not the absurdity of such a provision self-evident?

But Mr. Hobson proposes to put most of the troublesome questions up to the secretary of the treasury, who is to decide what constitutes market value, and what constitutes pig iron and all other iron and steel products, providing they are used as articles of construction. If the products are used for other purposes, the secretary need not bother his head about them. While on the witness stand a few days ago, President Farrell was asked what constitutes a market price, and he answered that "it is the price at which the majority of the tonnage is sold at a given time". But even that excellent definition would not leave the honorable secretary of the treasury without trouble, for he would have to decide at what price the majority of the tonnage is being sold. Would the quotations of the trade papers be accepted, or would the books of all manufacturers be searched every day, or every week, or every month? If there were conflicts, who would be supreme judge?

Hobson is entitled to the prize for conceiving the most absurd and impractical measure in a day of many visionary schemes and worthless nostrums.

Can the Steel Industry Grow?

A statement is credited to a prominent steel manufacturer: "The steel business is already too big to be capable of further expansion," but it would seem more reasonable to say that the steel industry has grown so much that it can hardly be regarded as incapable of further expansion. Possibly that is what the steel manufacturer really tried to say. The fact that the steel industry has grown is evidence in itself that it can grow more. No one can recognize a high point unless it has been passed.

It is well to repeat a comparison which has been made in other forms in these columns, to emphasize the fact that the growth in the iron industry in recent years has been relatively slow. From 1890 to 1898, both record years in their time, but with a very severe industrial depression intervening, pig iron production grew from 9,202,703 tons to 11,773,934 tons, an increase of 28 per cent. In another eight years, with prosperity instead of depression, production grew to 25,307,191 tons in 1906, which made 115 per cent gain. From 1906 to the present time, which is only seven years instead of eight, we have a growth to a present rate of 34,000,000 tons, which is only 34 per cent.

Of course, if one concludes that the slowing down in the rate of expansion indicates an eventful stoppage of all increase, or even an actual recession, nothing more can be said. It seems vastly more reasonable to infer that as the country itself has not stopped growing, the industry has merely tended to fall behind and has not been keeping pace. If so, greater, not less, expansion is needed for the future.

Objection may possibly be made to this comparison on the ground that it is of pig iron and not of steel. It is the same thing. Steel is made chiefly from pig iron, whatever the statistics of ingot production show. The remelting of unfinished steel swells the ingot figures, but the practical operation is that of mining iron ore and turning out unfinished steel. The quantity of old material used, however impressive it may seem when viewed apart, is small compared with the total output of castings and finished rolled steel. It grows from year to year, of course, but at most it represents merely the return of a portion of the finished product which was made years ago, when the total annual production was but a fraction of the present tonnage.

Gary Describes Development of the Corporation

Telling of the Failure to Raise Enough Money

After the Formation of the Federal Steel Co. and of the Appeal to Morgan—Describes the Policies of the Corporation—Early Difficulties in Bringing About Harmony

Judge E. H. Gary, chief executive officer of the United States Steel Corporation, continued on the stand last week as a witness for the defense in the suit of the government for the dissolution of that organization on the ground that it is an illegal combination in restraint of trade. His testimony was by far the most interesting and important which has yet been submitted in this case, emphasizing the fact that Judge Gary was the father of the Steel Corporation; that he was the leading spirit in the conception and execution of the plan for the formation of the great concern. As was expected, he related the history of the Steel Corporation, beginning with the formation of the Federal Steel Co., and following from then on down to the present. He told about the various policies which have been adopted and followed by the Steel Corporation; also about the opposition within the Corporation's executive organization to these policies in the early days of the Corporation. Judge Gary's testimony was practically a history of the steel business of the country during the past two decades.

Judge Gary, as is well known, and as he himself testified, has had all the affairs of the Steel Corporation focused in his office ever since the time of its formation. His auditors, therefore, considered him not so much in the light of an ordinary witness as in that of a man defending the policies which he himself has fathered. For that reason, though he made his statements in his usual simple and unaffected way, his examination had in it something of the dramatic. Judge Gary, on Wednesday of last week, came to the hearings, clad in a blue serge suit. On Thursday, which was a typically bright May day, he wore a brown suit. His throat was husky on the latter day and this he relieved by helping himself occasionally from a box of cough lozenges on the table before him.

Judge Gary's manner on the stand was that of a courteous and interested and friendly witness. At all times he concentrated the entire force of his mind on his testimony. He answered each question exhaustively, and from every point of view, so that there might be absolutely no misunderstanding as to his meaning. In fact, his replies were somewhat like a series of short speeches, which came from his lips slowly and methodically, somewhat after the manner of a man dictating to his stenographer. Each reply left an impression that that was Judge Gary's last word on the subject, that he had voiced it after careful deliberation and thought and that it was complete, so that there would be no corrections to make later on. Frequently he smiled, but it was that smile which is one of Judge Gary's most engaging features. It was a kindly smile and not one of mirth; it was the smile of the man who laughs with you and not at you. These smiles illumined his face at times when another man would have looked grave; when he was unusually earnest and considered his reply of more than the usual importance. He was anything but a hostile witness and during most of his examination, Judge Dickinson, of the government counsel, rather than interrupt Judge Gary's replies, volunteered to reserve his objections for insertion in the record at the close of each day. This offer, which had not been made previously during the hearings, was readily accepted by the Steel Corporation attorney, R. V. Lindabury.

During Judge Gary's examination last week, there was constantly on hand an unusually large audience. This included a large number of stockholders and directors, who had come to listen to their chief executive officer.

Gary Gives History of Consolidations

When Judge Gary resumed the stand last week he told about a letter which was written to him in 1898 by Nathaniel Thayer, of Boston, one of the two most influential stockholders of the Illinois Steel Co. at that time. Mr. Thayer asked Judge Gary for an opinion regarding a proposition which had been made by stockholders of the Elgin, Joliet & Eastern railroad to sell that road to the Illinois Steel Co. Judge Gary advised Mr. Thayer that this purchase would be of advantage, if made in conjunction with the acquisition of other properties. He advised that the Illinois Steel Co. sought to amalgamate with the Minnesota Iron Co. and the Lorain Steel Co., in addition to taking over the Elgin, Joliet & Eastern railroad. Judge Gary went down to New York soon after to attend a meeting of the board of directors and executive committee of the Illinois Steel Co. He was accompanied by John W. Gates, then president of the Illinois Steel Co., and W. L. Brown, acting chairman of the executive committee. The whole subject was talked over by Judge Gary and Mr. Thayer, and there was some discussion over the matter with Mr. Brown and Mr. Gates. Mr. Thayer soon after had an interview with H. H. Porter, who was the dominant factor of the Minnesota Iron Co. Judge Gary also had some conversation with Robt. Bacon, who was a member of the firm of J. P. Morgan & Co. and also of the board of directors of the Illinois Steel Co. A committee was appointed

to confer in regard to the proposed consolidation. This committee decided that there should be an amalgamation of the Minnesota Iron Co. and the Illinois Steel Co. The ascertaining of the values of the different companies was left to H. H. Rogers and the amounts he fixed were adopted.

Federal Steel Co. Formed

Judge Gary testified that it was conceded by every one that the actual values at that time of the ore properties were much in excess of the book values or the original cost of the properties. It was also conceded that the coal properties of the Illinois Steel Co. were very much more valuable than the original cost, or book value.

After the report of Mr. Rogers had been adopted, a committee was appointed consisting of Governor Flower, Senator Spooner, Robert Bacon and Judge Gary, with full power to prepare to consolidate the companies. The work was done very largely by Mr. Bacon and Judge Gary.

The owners of the Lorain Steel Co., which had a plant at Lorain, O., and also a plant at Johnstown, Pa., had offered their properties for sale several times to various people. "After considerable negotiation," said Judge Gary, "we decided to purchase their property on the basis agreed upon. The location of the company's works had a good deal to do with the determination."

"For all of these properties, plus $14,000,000 in cash, the new company issued a little under one hundred millions in stock." Judge Gary testified that the properties were actually worth more than the amount of stock issued. J. P. Morgan & Co. formed a syndicate to finance the consolidation.

The new company, The Federal Steel Co., commenced operations Nov. 1, 1898. It was a holding company. Judge Gary stated that the company was not formed with any purpose to create a monopoly or restrain trade in any steel product.

"Was it formed with any other object or purpose than the development of the business of manufacturing steel along the lines which you mentioned yesterday?" asked Mr. Lindabury.

"It certainly was not," was Judge Gary's reply. "The object was to form a rounded-out and practical organization which would produce and distribute to the best advantage and at the least cost, increasing the business at home and abroad."

After beginning business under the leadership of the Federal Steel Co., it was found that the plan and organization were good so far as they went, but the organization was too small; the capital was too small; the facilities for furnishing steel were not sufficiently diversified. "In fact, the Federal Steel," said Judge Gary, "was only the beginning of the plan or organization to carry into practical and successful effect what we had in mind and what we were endeavoring to accomplish."

In order to overcome the various difficulties a plan was devised for raising money by voluntary subscription of those interested in the Federal Steel in order to build finishing mills. "We did not succeed very well," said Judge Gary. "Mr. Morgan did not seem to be willing to take up the matter. H. H. Porter subscribed, or agreed to subscribe. Marshall Field also agreed to subscribe. It was proposed to issue bonds, but this was never done."

After the failure of the attempt to raise money, Henry C. Frick came to the office of Judge Gary early in 1899 and suggested that it would be a good thing for the Federal Steel interests to purchase the Carnegie properties and perhaps some other properties including finishing mills of various kinds.

Judge Gary and Mr. Frick made a preliminary estimate as to what the Carnegie properties could be bought for and as to what the other properties were worth. Judge Gary talked with Mr. Porter and Mr. Rogers and the latter two gentlemen talked with Mr. Frick.

Frick's Suggestion

"But we ascertained," said Judge Gary, "that Mr. Frick was not willing to agree that the whole Carnegie organization, including himself, would remain in the company and assist in carrying on the business, and for that reason we dropped the negotiations and told Mr. Frick that we did not consider the Carnegie properties anything like as valuable without the organization as they would be with it."

Judge Gary next heard about the Carnegie properties in connection with the option given by Mr. Carnegie to the Moore brothers. This option was dropped.

"The next thing I personally knew about it," continued Judge Gary, "Charles M. Schwab approached me one day, I should think early in 1900, with the statement that we ought to take over the Carnegie properties. He said they could be bought. I told him that the purchase of the properties would require a good deal of financing, and I would approach Mr. Morgan and see what, if anything, he would do. I did see Mr. Morgan and urged upon him

JUDGE E. H. GARY ON WITNESS STAND

the benefit I thought the acquisition of the Carnegie property and other properties would be to the Federal Steel Co.'s interests. I considered him interested in the Federal Steel Co. and its success. Mr. Morgan inquired why it was that we did not have the money, which is a very pertinent question to ask one who is desirous of borrowing money. Mr. Morgan did not seem inclined to take up the purchase of the Carnegie properties. He said that it was not a good time, or that it was too big a proposition, or something of that sort. I think that was early in 1900. Some time after that, Mr. Schwab again approached me and repeated his suggestion that we purchase the Carnegie properties, and I told him that it was a matter we had not been able to decide, or something of that kind."

Bacon Confers with Gary

Referring to the dinner which Mr. Simmons and Charles Sprague Smith gave to Mr. Schwab, Judge Gary said that Robert Bacon came to his apartments on Sunday morning soon after the Schwab dinner of Dec. 12, 1900. Bacon came in January, 1901. Mr. Bacon said that Mr. Carnegie had offered to sell the Carnegie properties and take his pay in bonds. Mr. Morgan had asked Mr. Schwab whether Mr. Carnegie would put that in writing. Mr. Schwab had said yes, and had left the house and returned with a little memorandum in the handwriting of Mr. Carnegie. "Mr. Bacon said that Mr. Morgan was desirous of having my opinion in regard to the purchase of this property," said Judge Gary; "that Mr. Morgan had been very much impressed by a speech which Mr. Schwab had made at the dinner, in which it was urged that there could be a steel proposition which would be very successful."

Judge Gary and Mr. Bacon discussed the matter at length with the viewpoint of securing and completing for the Federal Steel Co. a rounded-up iron and steel business. It was agreed that they would meet Mr. Morgan at the bank at 11 o'clock the following day and go over the subject with him. He had a talk with Mr. Morgan, who said that it was a good business proposition to purchase the Carnegie properties and he would consider the advisability of trying to form a syndicate to finance it. He wanted to know more about it. Mr. Morgan said he had been very much impressed by the remarks of Mr. Schwab. Judge Gary told Mr. Morgan that he would have to consult with the leading interests in the Federal Steel Co. This Judge Gary did, and went over the whole proposition with Messrs. Porter, Rogers, Mills and other directors. There was some opposition to the purchase of the Carnegie properties, but it was finally decided to purchase them if the proposition could be financed. The Carnegie company was desired particularly on account of its finishing capacity. The taking over of the American Steel & Wire Co. had also been carefully considered by the Federal directors because the Federal made wire rods but no wire products.

Judge Gary in his testimony also mentioned the other subsidiaries which were taken over and told why the directors of the Federal Steel Co. were in favor of having them come into the combination.

Mr. Morgan was informed concerning the decision of the Federal directors. He said it was a big undertaking, but if these gentlemen who were practical men were satisfied it was a good business proposition, he would undertake to form a syndicate to furnish the necessary financial support.

The next step that Judge Gary remembered was the calling in of distinguished lawyers, with whom he spent a good part of every day. The formal agreement was drawn up for the acquisition of the Carnegie properties, Judge Reed, of Pittsburgh, representing the Carnegie Steel, while Francis L. Stetson represented the Federal Steel and Mr. Morgan.

Judg Gary had much to do with taking over the wire companies. After the negotiations for taking over the various companies had been concluded and the capital stock of the new company had been fixed, a circular was sent out on March 2, 1901, telling stockholders of the various companies how their stock would be transferred and upon what terms. Judge Gary suggested that the new company be called the Federal Steel Corporation, but he finally decided on United States Steel Corporation. The Lake Superior Consolidated Iron Mines were acquired later than other properties. Negotiations were opened by Mr. Morgan, who called on John D. Rockefeller personally, but did not make much headway. The next Judge Gary knew about it, Henry C. Frick was negotiating with some of the Rockefeller people. The price which the Rockefellers asked for the ore land was somewhat larger than Judge Gary had estimated to Mr. Morgan, but it was reasonable, and since has proven very low. The American Bridge Co. was also purchased later than the others.

Well Advertised

Speaking of the circular, Judge Gary said, "If anything was ever advertised extensively throughout the United States, it was the organization of the United States Steel Corporation at every step."

Asked whether at the various conferences leading up to the purchases the suppressing of competition or acquiring monopoly was alluded to or discussed in any way, Judge Gary replied, "It was not." The purpose of Mr. Carnegie, if he had such a purpose, to go into the tube business, was not discussed.

Judge Gary said each subsidiary was purchased at as low a price as possible. The best located companies having good facilities for manufacturing diversified lines were selected. Others which were not wanted might have been secured.

"I say conscientiously," declared Judge Gary, "that there was no effort or disposition on our part to secure a monopoly or restrain trade. Our intention was and has been to extend trade and foster competition, and we have done that."

Aid of Morgan Was Necessary

Judge Gary, in his testimony, Thursday, said that the Corporation could not have been formed without the aid of J. Pierpont Morgan.

In answer to a question by Mr. Lindabury, Judge Gary said it was not always possible to find plants having the required facilities which were not to some extent in competition with some of the other plants. This competition was, however, incidental. The firm of J. P. Morgan & Co. acted as financiers. He added: "They did not assume to be anything else. They were asked to be the financiers. So far as the business questions were concerned, they did not assume to act.

"Of course the organization of the United States Steel Corporation was not possible except for the strength and influence of J. Pierpont Morgan; first, because it was necessary to have a financial concern of his strength and there was no other that was comparable to Mr. Morgan in that regard; and secondly, because the men connected with the various subsidiary companies, as they afterwards became, had confidence in J. P. Morgan and his firm and anything that he would finance, or anything that he would become connected with or stand

for, and this made it certain that immediately the general public, including these gentlemen connected with the companies that I have referred to, would have confidence and did have confidence in the general enterprise.

"While the Federal Steel Co., or the Federal Steel men, were the ones who were desirous of accomplishing the organization and its result, and had charge of the business part of it and really controlled and decided the business questions that came up from time to time, yet they needed the financial strength and influence of J. P. Morgan in order to accomplish what was accomplished, and could not have succeeded otherwise. That was well understood.

"I want to say that it was understood that J. P. Morgan & Co. had the right to formulate and put into effect a plan for the organization of the new company. They had the right to determine how many members should be on the board of directors, what character of committees should be formed at the outset, and things like that. They did act in that capacity, but never without first consulting the Federal Steel interests did they decide upon any plan as to the number of directors, as to who should go on the board of directors, as to the kinds and characters of committees, who should go on the committees, and so forth."

"And why was that power or authority given to them?" Mr. Lindabury asked.

"Because it was believed that would be agreeable to the representatives of the companies, and we thought that would add to the confidence which everyone might have in becoming connected with the Corporation.

"We used the great strength and influence and reputation of J. P. Morgan & Co., so far as we possibly could, and J. P. Morgan & Co., on the other hand, were just as fair and fine and as generous as anyone possibly could be in taking pains to consult the Federal Steel interests before any question which might affect the company's business was decided."

Development Home and Abroad

Judge Lindabury then proceeded to inquire as to the development of the Steel Corporation business at home and abroad and the policies which encouraged that development. Judge Gary declared that the Corporation had favored stability of business as opposed to demoralization of business, so far as it could legitimately do so. It has been a decided factor from time to time in keeping prices down to a fair level, but prices are generally controlled very much by the business conditions of the country. They are fixed by the laws of trade, supply and demand, but the Steel Corporation has endeavored to prevent sudden and violent fluctuations. This policy was pursued first of all because it is in the interest of the employes, and second because it is in the interest of the customers of the company. Steadiness of business keeps the mills in operation and affords opportunity for the continuous employment of the laboring man. The Corporation's policies have kept the mills running and enabled it to maintain and advance wages. The Corporation reduced wages only once since it was formed. That was in the depression of 1904, after the Corporation had passed its common stock dividend. At other times, when competitors reduced wages, the Corporation maintained them.

Asked by Mr. Lindabury what effect the policy of price stability has had on customers and competitors of the Corporation, Judge Gary said there never had been stable prices, as that is never possible. "Stability of prices in the business is not a fact," he said, "and I would distinguish between that and stability of business." Customers, he said, prefer stability of business and fredom from wide fluctuations. He gave several illustrations to show the disastrous effect of violent fluctuations.

"The effect of our policy," continued Judge Gary, "has been to steady in a large measure business conditions, to prevent failures, to prevent demoralization, to protect our customers, and especially, to protect and promote the interest of our employes.

"We have treated our competitors as competitors. We have pushed our business and pushed it hard. Our competition has always been active and keen, and we have done business with our competitors in a business way; but we have treated our competitors as gentlemen ought to be treated. At least that has been our endeavor. We have been of benefit whenever we could.

"If we have been dishonest or tricky or mean in our treatment of our competitors, it has not been done with the consent or knowledge of those in control of the affairs of the Steel Corporation, its board of directors, its finance committee or its officers. We have tried to be frank and open with them. We have admitted them to our mills. We have given them our figures. We have frankly stated to them our business conditions in detail and in every way have tried to give them the benefit of our experience; so that I am justified in saying we have fostered competition. I would be very much surprised to find that any of our competitors in business have complained of our treatment of them, and should be very sorry if that were so.

"On the other hand, in olden days, the rule in this country was different in this line of business. There was a competition that was bitter, fierce, destructive. If it did not absolutely drive competitors out of business, it so harassed and injured them as to prevent them extending their business, or from taking advantage of their location, and at times compelled them to close their mills and discharge their employes and disrupt their organization."

Judge Gary was asked if the Steel Corporation ever sought to obtain a customer of a competitor by secret rebate or departure from its published price. He answered in the negative.

The next point taken up was the extent to which economies contemplated when the Steel Corporation was formed, have been realized. This subject the witness went into at great length. He said the economies have been developed as was expected. They have been brought about through constant operation of the various properties; economical handling of raw materials; distribution of orders to the mills in various zones, causing a saving in freight rates; through increased efficiency from constant comparing of one man's work with that of another; through discovery and development of new processes and new products; through the ability to do business with one-half the cash balance that would be required in the banks if the various companies were segregated and in various other ways.

He also described the welfare work which the Corporation constantly pursues in the interest of its employes, saying:

"We have built up to a large extent a feeling among our employes that

we have a disposition to regard and promote their interests, their welfare. I want to say in that connection that that feeling has made our men more efficient and more determined and more willing to do everything they can to promote the pecuniary interests of the Corporation; that furnishes a return in dollars and cents and is of great economic value."

He told of the voluntary relief fund, the bonus system, pension system, stock subscription plan, and other similar features adopted by the Corporation for the benefit of its employes. He told of parks and recreation grounds made for them, and described how the Corporation has provided sanitary conditions for the workmen both in their homes and in the mills.

"We have co-operated with our men as we have with our customers and competitors," continued Judge Gary, "and it has paid big in dollars and cents, as well as in great satisfaction to ourselves."

Conflicting Views Harmonized

Speaking of the internal operations of the Steel Corporation, he said that the plan for its organization operated fairly well but was not as successful at the start as afterward. "We brought together a great many different companies and a great many different organizations and opinions were more or less diverse," said Judge Gary. "It required a great deal of patience and some time thoroughly to organize these different forces and to overcome and change some of the policies which had been pursued by some of the companies previous to that time. Mr. Schwab was ill and away from New York a great deal. We were deprived of his ability and his judgment and influence, and particularly his influence with the Carnegie forces. Perhaps, if he had been here, we would not have agreed upon some questions. The executive committee was intended to have charge of the business affairs of the Corporation. Mr. Schwab had the right to preside at the directors' meetings, and did, and was a very able and aggressive force, thoroughly committed to the policies of the Carnegie company, while Mr. Roberts, and perhaps I might include myself, had somewhat different notions in regard to these matters, and, all in all, the executive committee was not a practical success. Mr. Schwab was president and ex-officio chairman of the finance committee. I was chairman of the executive committee, and ex-officio member of the finance committee. Sometimes Mr. Schwab might have one opinion and I might have another, but I refer to these matters only as obstacles preventing the immediate and perfect success of the organization at the start. Then there were expressions made concerning the treatment of labor, or our competitors, which some of us did not approve, and it took time and patience to overcome these obstacles."

Judge Gary continuing said that when Mr. Schwab resigned, Mr. Corey was elected president, and the office of chairman of the board was created. Judge Gary was elected to that position, and the chairman of the board and chairman of the finance committee together had the power of the finance committee when it was not in session. At a later date, Judge Gary became chairman of the finance committee, and as time went by, and the officers of the subsidiary corporations, their assistants or associates, became better acquainted with the officials of the Steel Corporation and with the policies adopted, all naturally came into harmony and for eight or nine years there has been the very best harmony.

"Everything," said Judge Gary, "has been very satisfactory except for the fact that the government does not seem to think that we have done as much or as little as we ought, whichever it is."

"Possibly both," interrupted H. C. Colton, of government counsel.

"Possibly both," admitted Judge Gary. "Of course I must admit that we have made mistakes from time to time of various sorts, and our subordinates sometimes have done things that we would rather they would not have done, that we would not have approved or would not have authorized. I think for a good many years their management has been fair and good."

Judge Gary continued as follows: "Public discussions of questions, the attitude of the president, discussions in congress and in the newspapers and magazines have all had their effect upon us all. It has never been our policy or our practice to ignore or disregard or defy public sentiment."

Asked as to whether the policies of the Steel Corporation had restrained trade or suppressed competition, Judge Gary said the effect had been quite the contrary. "These policies," he said, "have tended to develop trade, to extend trade, to foster competition and to prevent wrong and imposition of every kind."

Judge Gary submitted approximate figures showing the percentage of the country's production controlled by the Steel Corporation in 1901 and 1911. He explained the figures were perhaps understated instead of overstated in the Corporation's favor. The figures were:

Commodity.	1901 per cent.	1911 per cent.
All kinds of rails	60	56
Wire rods	77	65
Heavy structural material	62	47
Plates and sheets	65	46
Merchant bars	..	21
Tin plate	73	61
Welded tubes	57	37
All steel wire rolled products	50	46

Judge Gary testified that no plants were purchased by the Corporation for the purpose of dismantling them, and the very few properties purchased had been taken after the owners had urged the Corporation to buy, or at least requested it to do so. Concerning the purchase of the Union Steel Co., Judge Gary said that one reason was that the Corporation was very desirous of the active participation of H. C. Frick in its affairs. In December, 1902, at the time of the purchase, Mr. Schwab was sick and away. Mr. Frick was connected with the Union Steel Co. "Now," said Judge Gary, "whether it is legitimate or not, these facts were important in considering the question as to whether we would take over the Union Steel. Mr. Frick, as an individual, was not in competition at all."

"Was the purchase made to eliminate the competition of Union Steel or any owners known or reputed of the Union Steel at that time?" asked Mr. Lindabury.

"It was not. It was agreed, as I remember, that some of those connected with the companies, I should say including Mr. Donner and the Mellons, would not engage in competing business or in the steel business for a term of years. That provision was quite usual in those days, and it was put in by the lawyers, but I doubt if it was ever considered by any of the United States Steel

Corporation. Anyhow, we never thought of it and we never insisted upon it, and I do not think it was ever observed."

"I object to the statement that it was not observed unless based on some fact known to the witness," interrupted Mr. Colton.

"Based on the fact, for instance," continued Judge Gary, "that the Mellons were interested in McClintic-Marshall, I think it is, which has been very actively engaged in the steel business and in competitive business with us, and also because of the fact that Mr. Donner became connected with Cambria Steel Co. several years ago."

Says Government Allegations Are Ridiculous

Classifying as ridiculous the government's allegation that the Steel Corporation purchased the securities of the Tennessee Coal, Iron & Railroad Co. in order to put it out of the market as a competitor, and giving other interesting testimony regarding this purchase and other matters connected with the policies and development of the Corporation, Judge E. H. Gary again sat as a witness for the defense June 2. Under the questioning of Attorney R. V. Lindabury, of Steel Corporation counsel, he took up ore transportation railroads of the Corporation in the Lake Superior district and described the policy under which they are operated. They are employed, said Judge Gary, simply to overcome transportation problems which the Corporation encounters in shipping over even the largest trunk lines; they are at the disposal alike of the Steel Corporation and its competitors in moving ore from the ranges.

Advantages of Export

Judge Gary told about the advantages which accrue to both the Steel Corporation and its competitors as a result of the export trade which the former has developed. This trade is an important factor in enabling the Corporation to run its mills at full schedule, and is as well a source of relief to its competitors. Regarding its ore reserves, Judge Gary said that the Corporation is not sufficiently fortified in this direction, and when these give out the Corporation will probably have to depend largely on leaner ores, for the economical use of which new processes will have to be discovered.

Judge Gary began his testimony by giving the names of the Steel Corporation's iron ore experts from the time of its organization. These were James Gayley, first vice president of the Corporation; Thomas F. Cole, the president of the Minnesota Iron Co., and various assistants at that time, like W. J. Olcott, J. Uno Sebenius, and others. Professor Hulst had been connected with the ore business and, Judge Gary thought, he continued for some time in that position. The Corporation never acquired any ore properties except upon the advice of these experts, who based their recommendations upon their belief that the ore in question was necessary for adequately filling the future requirements of the Corporation.

Reserves Were Small

At the beginning, said Judge Gary, he did not have his attention called to the comparative ore reserves of other steel manufacturing concerns very often; as time went by, however, the Corporation's experts directed his attention more and more in this direction, and he became aware that many, if not most, of the Corporation's competitors had larger ore reserves in proportion to their requirements than did the Corporation. Large bodies of ore at the time were owned, said Judge Gary, by the Cleveland-Cliffs Iron Co., Pickands, Mather & Co., Oglebay, Norton & Co., M. A. Hanna & Co., Corrigan, McKinney & Co., Cambria Steel Co., Pennsylvania Steel Co., Republic Iron & Steel Co., and Jones & Laughlin Steel Co. At the time the present suit was filed, said the witness, the Pennsylvania Steel Co. had a supply sufficient to last hundreds of years, and the Bethlehem Steel Co. the same; the Inland Steel, the Republic, Jones & Laughlin and Cambria also had much larger reserves, relatively, than the Corporation.

Railroads Necessary

"The United States Steel Corporation acquired, along with its other properties two important ore railroads in Minnesota. What occasion was there for the ownership of these railroads by the Corporation and how have they been operated by the Corporation or its subsidiaries with reference to the service of the Corporation's competitors?" asked Mr. Lindabury.

"They have been operated as common carriers," said Judge Gary, who described the railroads generally and added:

"These roads were and are necessary to the success of the Corporation's iron and steel business, and the transportation of ore from the mines to the docks, where they are delivered to the ships on the lake. They are neecssary to the Corporation particularly for two reasons, first because they permit of continuous operation, that is, an uninterrupted operation, which is very necessary to the economical ure of the ore; and secondly, for purposes of separating and distributing the various kinds and characters and grades of ore; in other words, to get the best use of the ore. So that it shall be handled to the best advantage of the manufacturing companies it is essential that the control of these railroads shall be substantially the same as the control of the furnaces. Particularly it is necessary to have these railroads kept in the very best condition all the time in order to utilize them to the best advantage.

"A railroad owned by a company, unless able financially to keep it all the time in the nearest to perfect condition could not be utilized anything like as well as these railroads have been used. Now, I said it was necessary for the railroad to be owned by the same interests as the United States Steel Corporation in order to have the furnaces get the best kind of treatment and the best conditions. I should modify that statement to this extent: I think our railroad companies have served the independents at all times and in all respects fully as well as they have served the United States Steel Corporation interests. There has been no discrimination against independents in the slightest particular, so far as I know, and certainly we would not permit anything of that kind, if we knew it, and we have had no complaints of that kind to make us think that there has been any discrimination.

Not Possible In Practice

"It follows, therefore, if some other company, an outside independent company, owned this railroad and could and would serve our ships and our furnaces as well as our railroads do it, then there would be no difference; but we know in practice that is not a practical position, positively. I have never found any other railroad in this country that could or would give us exactly the same treatment or approximately the same treatment. Unless there is a congestion in the freight business, as frequently occurs, we suffer materially at points by reason of the fact that independent railroads, including the very best, like the Pennsylvania railroad as a type, and others, do not and cannot afford us the same facilities for the transportation of our products entire into the mills or out of the mills.

"We have closed down our furnaces even, we have closed down our coke works, we have been interrupted and delayed and have been compelled partially to interrupt our business by reason of the lack of railroad facilities, where we depended upon the service of independent railroads. Now, we know by practical experience that having control by the United States Steel Corporation of these railroads, we have been able not only to furnish first class facilities and service to the independents, but also to ourselves, which we could not get in any other way by any other means."

"In the early part of 1907, you took a lease from the Great Northern Ore Co—I think that is the name—of certain ore properties in Minnesota, the lease being familiarly known as the Hill lease. Why did you do that?"

"There was a body of ore which we estimated to amount to about 250,000,000 or 275,000,000 tons. Of course the estimates now are very much larger, running up into

600,000,000 or 700,000,000 tons. Our experts had been urging us to secure that ore, if possible, in order to furnish us with an adequate supply of ore for the necessities of the furnaces and mills in our business. The question had come up frequently for discussion. We found our competitors were securing ore much more rapidly than we, in comparison; at least we believed that; had no doubt of it. Anyhow, considering our manufacturing capacity, we were convinced that we actually needed that ore, and I am sure at the present time we ought to have that and a good deal more for our business."

"For instance, think of the Pennsylvania Steel Co. having 500 or 600 years' supply of ore on hand, and the Bethlehem, I suppose, several hundred million tons of ore supply on hand, and other companies 50 or 60 years' supply of ore, and we having 40. We haven't enough; we ought to have more, and the result will be, of course, that we will have to come down to a very much cheaper grade of ore some time, sooner than we ought. We will perhaps be deficient unless we make discoveries that we do not know anything about now, as some others have been making the last few weeks, even months."

"Was there any difference of opinion among the directors of your company with regard to the advisability of taking the Hill lease at the price or rent offered?"

"We decided to cancel the lease and gave notice of the cancellation because we found by practice the cost to us of concentrating and utilizing these ores was very large, and larger than we had expected. Also, I may say, because it is a fact, we were to some extent influenced by the fact that in the report of the commissioner of corporations it was claimed our ore reserves were so large as to be objectionable to the government, and tending toward securing or maintaining a monopoly in the iron and steel trade. We have never been disposed, as I think I said before, to ignore, certainly not to defy, any suggestion made by any department of the government concerning our management."

"Was the lease taken with any intent or purpose of effecting a monopoly in iron ore or anything else?"

"It was not."

"Was it taken with any intent or purpose of acquiring these ores beyond the Corporation's needs, in order to keep them out of the hands of competitors, present or prospective?"

"No."

"Would the continued holding of these ores in connection with your other ore holdings give you a reserve for as large a number of years as the average reserve of your competitors?"

As to Southern Ores

"No. In my previous answer I did not refer to the Tennessee company's ores at all. I do not consider they come into competition, really, with the northwestern ores, the Minnesota and Lake Superior ores, because the markets are different. The Tennessee Coal, Iron & Railroad plant supplies a certain market within a certain territory. That territory is large in extent, but limited in demand for the products. At some time we hope and expect that to be a very great market. It may be a long time in the future. The freight rates determine largely the market for any given product, and the question of territory of any particular market is susceptible of mathematical demonstration, by reason of the freight rates. The products of the Tennessee Coal, Iron & Railroad Co. cannot successfully compete with the other markets, the northern markets; they never have and never will, possibly, successfully compete with them."

The Tennessee Purchase

Judge Gary then proceeded to relate in great detail the negotiations which resulted in the purchase of the Tennessee Coal, Iron & Railroad Co. He said that the properties had been offered to the Steel Corporation many times during the years preceding the panic of 1907. The Corporation had decided conclusively against the acquisition. The competition of the company was not worth considering. "The idea of our buying the Tennessee properties to eliminate their competition," said Judge Gary, "is about as ridiculous as anyone could imagine."

Judge Gary said that some good men, such as L. C. Hanna, E. W. Oglebay, John A. Topping and others, had been interested in the Tennessee company, but its stock had been of a speculative character. Because the stock was moved up and down, as a few individuals desired it to go, the company had never been a success and was not likely to be made a success.

Coming down to the time of the panic in 1907, Judge Gary told of the conversation which he had with J. P. Morgan, Percival Roberts, Henry C. Frick and Mr. Ledyard. Mr. Morgan stated that financial conditions were growing worse and that additional complications might be precipitated at any time and he believed that the purchase of the Tennessee securities by the Steel Corporation might be advisable. He certainly would like to have the matter given very careful consideration. Mr. Ledyard emphasized what Mr. Morgan said. Judge Gary and Mr. Ledyard tentatively agreed upon a price which would net the stockholders of the Tennessee company 90 for the stock. Judge Gary did not think that the stock was worth that. "It seems to me," said Judge Gary, "I told Mr. Ledyard I did not consider the stock was worth over 50; that is my best judgment."

Mr. Frick was opposed to the purchase and suggested that the Corporation offer to loan the firm of Moore & Schley $5,000,000. Mr. Ledyard, after talking with Mr. Schley, reported that $5,000,000 would not answer their purpose to save the situation or save Moore & Schley.

At a later conversation, Mr. Ledyard was very emphatic in saying that there was no possible way of affording relief to Moore & Schley except by the purchase of the Tennessee stock which the firm had. He said he would recommend acceptance of 90, and I said I would recommend the purchase at 90, in order to relieve the situation.

The finance committee of the Corporation considered the proposition satisfactory, under the circumstances, but Mr. Ledyard, after conferring with Mr. Schley, reported that they could not possibly get through on that basis. Mr. Ledyard finally said they could get through on the basis of 100 for the Tennessee stock, paid in Corporation bonds.

Judge Gary then told of his conversation with Mr. Morgan, proposing that the president of the United States be consulted in regard to the proposed purchase. Mr. Morgan agreed that it would be well to make the trip. Before deciding to go to Washington with Mr. Frick, Judge Gary said an agreement had been reached with Mr. Ledyard on the purchase at a price subject to what might develop in Washington.

Judge Gary told in detail of the panic-stricken bankers in New York, and of how they would assemble in large numbers at Mr. Morgan's library.

"Mr. Morgan," said Judge Gary, "was the one great figure that stood up there and held the situation. I do not exaggerate at all in saying that he was the one man and the only man in this city, or anywhere else, who did or who could stand up at that time and by reason of his great strength and his wealth and his influence over the bankers and the confidence which they had in him, prevented utter demoralization, and he did that; he arose to that occasion as no man probably will ever rise again. I am not exaggerating it; I cannot adequately express what he did and what the situation was at that time."

Judge Gary next related at length the story of the visit made by himself and Mr. Frick to Washington. The facts related were substantially as heretofore published.

OBITUARIES

The death of John Taylor, founder of the J. & J. Taylor Safe Works, Toronto, Ont., took place on May 26, at the age of 84 years. Mr. Taylor was born in Perthshire, Scotland, but came to Toronto when a boy.

T. Harry Huddleston, Philadelphia, manager of the American Radiator Co., died at his home in Ardmore, on May 24, of typhoid fever, after a short illness of two weeks. Mr. Huddleston was 35 years old and is survived by his widow and a seven-year-old son.

John Henry Ruwe, Brooklyn, N. Y., a partner in the firm of Ruwe Bros., iron and steel manufacturers, with offices at 765 Atlantic avenue, committed suicide recently at his home, 250 Garfield place, as a result of a prolonged illness. He was an enthusiastic yachtsman and two years ago was commodore of the Unqua Corinthian Yacht Club, at Amityville.

William Whitworth, formerly iron works superintendent of the Fall River Iron Works plant at Fall River, Mass., and a native of Manchester, Eng., died recently at his home in Fall River, aged 76.

Ambrose Barnaby Winslow, for many years engaged in manufacturing nails at what is known as the Forge Nail Factory, at Fall River, Mass., which suspended operations in 1864, died recently at his home in Fall River, aged 92.

Men employed by the Russell, Burdsall & Ward Bolt & Nut Works, Port Chester, N. Y., are on strike. They ask a union shop, 25 per cent wage increase and a nine instead of a ten-hour day.

A contract has been awarded to the H. Wales Lines Co., Meriden, Conn., for the construction of large extensions to the plant of the Yale & Towne Mfg. Co., Stamford, Conn., manufacturers of hardware specialties. One of the new buildings will be three stories in height and 245 x 296 feet; the other six stories in height and 50 x 200 feet.

Interviewing the President

(*Continued from page 1277*)

are put at him. When he feels free to answer them, he does so with carefully worded, expressive sentences, easily understood. If he is not familiar enough with the question asked him, he says so in the fewest possible words, and often expresses regret that he cannot give the desired information. If the question is one on which he thinks it not good policy to talk, he again says so. Some of the newspaper men insist he is artful in his replies. Others say it is not artfulness, but mere civility, claiming he responds tolerantly to any and all questions, where many a previous president would either have been brusque in his reply, or his well known opposition to what he might consider impertinent questions would prevent their being asked.

Californian anti-alien legislation has been asked about more than any other single subject in recent interviews with the president, although it is a delicate issue, and the president in his answers has denoted that he does not mean to overstep the bounds of diplomacy. Other questions asked the president nowadays pertain to Panama canal tolls, the sundry civil bill, patronage, the lobby, the relations between Mexico and the United States, the tariff, currency legislation and naval armament. Inquiries about some of these matters are asked with the belief, if not knowledge, that they cannot be answered concretely.

The average interview with the president by newspaper men lasts something like 15 minutes. When it is over, he bids them a cheery good day and resumes his task on the nation's business. Not long ago he was asked to have his picture taken with the newspaper men. Grabbing his hat, he quickly announced his readiness and the group went out to the lawn on the south side of the White House and the picture was taken. After it was over, the president mingled and chatted with the newspaper men and seemed reluctant to return to his office and work.

In order that both the morning and evening newspapers of the country may have an even chance at getting first interviews from the president, he meets press representatives in the morning each Monday and in the afternoon each Thursday, provided there is nothing which requires his attention at these times.

Unless permission is given by him, the time-honored custom of never quoting the president direct is observed. On one occasion President Wilson gave consent to being quoted direct. That was when he explained his reason for appearing before the house and senate as a joint body to deliver his address calling the special session of congress.

Nothing at all of the spectacular is seen in President Wilson, unless indeed his very unostentation itself makes him appear so. To enter his presence is precisely like appearing before any wide-awake, plain business man.

His actions and dress give this impression. His humorous side is unquestionably cultivated more than that of the average business man. Now and then he corrects himself for over-jesting, finding himself doing it in regard to grave subjects, but at the same time appreciating the seriousness of the topic under way. It is not that he aims his humor at the subject itself, but rather it is meant to offset a too serious aspect.

Only during the past 10 or 12 years has the press been given general recognition by chief executives. A little over a decade ago to see the president frequently was out of all question, and some who have occupied the highest position in the land were anything but cordial in their relations with the correspondents.

President Cleveland's Views

President Cleveland was especially difficult to approach. He had no scruples in expressing his contempt for the press, and never for an instant entertained the idea of receiving newspaper men regularly. He objected to being "spied" upon, as he expressed it and in an address at the Louisiana Purchase Exposition in St. Louis, then out of office some seven years, paid his compliments to the newspapers as being "meddlesome and scandalous". Newspaper correspondents still in Washington who have seen a number of administrations pass say they recall only one detailed interview ever given out by President Cleveland, and of the two publications for which it was intended, one was a foreign paper, *The London Chronicle*. The other paper was *The Boston Globe*. To A. Maurice Low goes the distinction of having obtained this interview. President Harrison was a veritable sphinx when it came to getting news. As inaccessible as Mr. Cleveland, he was also of an aristocratic bearing, which bordered on boorishness, according to correspondents who shared the general denial of an audience with him. Going back to the days of President Hayes, inaugurated in 1877, organization of news service was in an embryonic stage, and was a sort of hit-and-miss matter, and affairs of national import were not handled so freely as they are today. The obtaining of news from a president then depended in part on the locality from which the president came, and papers of Ohio, especially those of Cincinnati, were able to get material from President Hayes where other papers failed. It was largely a game of favoritism, an element which has not been denied its part in the past decade, by the way, but insignificant now to what it was. Being an Ohioan, President Hayes gave out information to papers of that state. This explains the success of the old *Cincinnati Gazette*, owned by Richard Smith, in getting presidential news from the industrious Henry V. Boynton, its correspondent. Presidents Garfield and Arthur were not fruitful news sources by any means.

President Roosevelt, it is readily recalled, was a fountain of news. His clever system of seeing that some big story "broke" for Monday morning papers, which ordinarily suffer from a dearth of news, is well known beyond newspaper circles. While he never saw newspaper men regularly, he was seen almost daily, or practically as often as it was desired by newspaper men. It was a common thing for him to call "the boys" into the executive office and give out a typical Rooseveltian story with its crisp, pungent statements.

To the martyred McKinley kindly remembrances cling in the minds of Washington correspondents. He was unusually democratic.

"Was he easily approached?" said an old-time correspondent, with ill-concealed surprise, when asked that question regarding Mr. McKinley. "Well, indeed he was, God bless him. We went in and saw him whenever we felt like it, and he was always good to us. If we did not feel like going to the White House, why, we called him up by 'phone, and if he was not busy with something important, he talked right back and told us what we wanted to know, if he possibly could do it without sacrificing diplomacy." One correspondent recalls that some senators complained that President McKinley showed preference to seeing newspaper men rather than the senators themselves.

It is easily imagined that President Taft, with his well known genial nature, was a source of delight for correspondents, who say he was as readily interviewed as was President McKinley, even by the rather undignified system of using the 'phone. Almost any afternoon he was good for an interview, if the correspondents cared to see him.

John Boyle, of *The Wall Street Journal*, is the oldest of the 200 Washington correspondents in point of service, who is still active in the field of the nation's capital, and has rounded out a little more than 30 years.

Practical Value of Microscope

(*Continued from page* 1307)

metals, and in determining when an eutetic alloy of iron and carbon are produced. By an eutetic alloy is meant an intimate mixture of two elements without any precipitation or separation of either during solidification.

The microscope may be used to examine the head of a rail, the tread of a wheel, the face of a roll, the surface of a die, to see the effect of crushing, the flow of metal and the abrasion.

An investigator must not be too ready to condemn a piece of steel or iron because he has noticed something in its structure which does not look like the remainder. Wrought iron always carries streaks of slag, steel may show small segregated areas, small seams on the surface or small pockets filled with slag and oxides. Any moderate sized casting or forging will show a coarser structure at the center than at the edges, due to a different rate of cooling or work received, but none of the appearances given indicates that the metal has lost its practical value and is unfit for use.

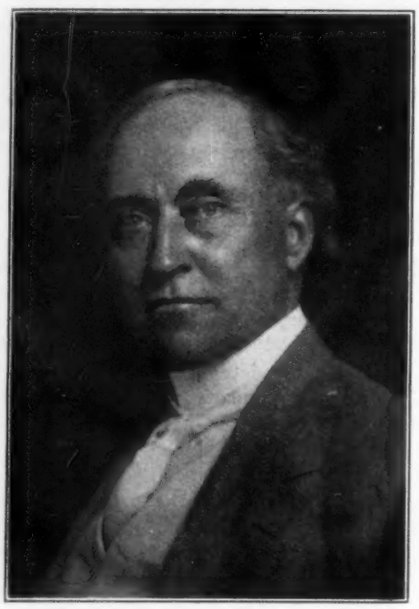
The investigator must be able to properly interpret the results and to keep in mind that conclusions are best drawn from a rapid examination of from 50 to 100 tests, rather than from the examination of two or three. As a large number of tests are more valuable than a few, the speed and cost at which they can be produced are important. No directions can be given for quickly obtaining a specimen, as these vary with the material, but when secured, no machine work other than chipping or filing a flat surface should be necessary, and 15 minutes labor should be sufficient to file, grind, polish and etch a specimen, except for special purposes.

Metallography must compete with chemical, mechanical or other tests in the shops or laboratories, and that test, which will furnish the most information in the shortest time and at the least cost, will usually have preference.

The carbon content of steel which has been slowly cooled is shown approximately, only, by the microscope, but the exact composition must always be determined by chemical analysis. Physical properties are best determined by mechanical tests. Proper hardening of a tool, good case-hardening, decarbonized skin on the surface, surface cracks, cavities, seams or laps and depth of cementation are better and more quickly shown by the appearance of a fractured surface to the eye, and by tests of the hardness with a file, scleroscope, or some other form of hardness test.

An etching or pickling test of a full-sized object will show blisters, seams, easily-corroded areas, and slag inclusions much better than a micro-specimen, and, in addition, has the advantage of permitting an inspection of the entire object. Blow-holes, pipes, detailed fractures, depth of chill, condition of the center of malleable iron, improper annealing, imperfect welding are best shown full size. A crushed or worn rail, or a bearing carrying a heavy load is examined as a whole, either before or after etching. Sulphur and phosphorus printing is easily executed and shows the segregation of these elements. Slip is shown by the fibrous appearance of the fracture of a tensile test.

It is unlikely that micro-examination will supplant regular shop test,



GEORGE A. ST. CLAIR

or that metallographic specifications will be included in future specifications, as they could not compete, nor are the results as convincing in most cases as other tests. So much can be learned by an intelligent study of analyses, fractures, structure, hardness and various physical and mechanical tests that the microscope is best used to verify, if possible, what is already known.

Prof. Sauveur has shown three specimens of the same composition, but differently treated. While they differ in appearance, the facts that they are of the same steel, but differently treated and possessing definite properties had to be determined by chemical and other tests and not by the microscope.

The micro-photograph has been the principal method used to date in reporting results. A few attempts have been made to report the percentages of micro-constituents in the same manner that a chemical analysis is reported. Photographs are costly and require considerable labor in their production. When finished, they are only of comparative value, as no effort has been made by different investigators to standardize the magnification, the etching medium, and the illumination, all of which produce great differences in the photographs and render comparisons difficult.

A report of a micro-examination of a steel should be accompanied by the analysis and results of mechanical tests, in order that an improvement in quality may be made, or a mistake in the manufacture or heat treatment corrected. Those who receive such reports must be able to intelligently interpret the micro results.

Ore Reserves of Future

"Eastern Mesabi Magnetic Range" was the topic of a paper read before the American Iron and Steel Institute by George A. St. Clair, Duluth, an authority on the Mesabi ranges. He described the known districts and the character of their ores, and referring to the early days of mining, said:

"There was no effort made to save the soft hematite which formed the larger quantity of the good ore then showing. This was wasted, being often used as roadmaking material. Think of it! Thousands of tons that would analyze from 60 to 64 per cent iron, called useless simply because the furnaces of that day demanded the hard varieties.

"Our superabundance of these ores is such that we cannot only supply our own wants but the wants of the world for the next thousand years". In support of this bold statement, he pointed out the existence of a range in northern Minnesota unknown to the government geological map-makers as yet which contains "over 6,000,000,000 tons of ore, averaging about 36 per cent iron, many samples, of course, much lower, as well as higher. Large as this mass of material is, it would not surprise me were it to be doubled by actual work.

"This ore can be used by either metallizing or sintering—both methods have their advocates. * * * It is promised and expected that a standard ore of at least 63 per cent natural will be the product derived from the magnetite, giving the furnace an ore the equal of that used in the days of old.

FOREIGN MARKETS

BRITISH IRON TRADE

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., May 24.

Pig Iron.—The pig iron market continues in an abnormal condition with great uncertainty as to the future. The prices at Cleveland speak eloquently as to the artificial condition of things. The latest quotation is 69s 6d ($17.02) for prompt sales with 60s 9d for July and three months. This shows an entire absence of confidence as to the future, absolutely destructive of forward business. At the same time, the fact that "bears" are obliged to pay such high figures, shows how close to the danger line they have been operating. Even with this state of affairs, there is no material addition to stocks, which now stand 236,500 tons. There are signs in the Midlands that makers and buyers are coming a little together. They are a little readier to contract, and buyers having pulled down prices to the extent of 8s or 10s below the maximum are now open to negotiate for moderate amounts; but there is no heavy contracting. Steel-making irons have not shared the weakness of other brands, and there is some difficulty in obtaining prompt supplies, while there are practically no stocks. There is still a great demand at Barrow-in-Furness in respect of foreign requirements. So far, the conclusion of the war has not brought the slightest assistance to the pig iron market. The only element helping to keep up prices is the very high selling rate of fuel. New contracts have been arranged at prices from 6d to 1s above those of last year. The prospective demand for steel is so great that hematites would seem to be secure of a fairly sound position for the rest of the year.

Finished Iron and Steel.—All branches of the iron and steel trade are showing weakness. This is quite usual where pig iron has led the way in the downward direction. Naturally, all consumers of finished material demand their full share of whatever reductions are being made. In ordinary common iron, this has actually happened. Unmarked bars are quite 10s below what they were, and the commonest brands have fallen to an even greater extent, for the simple reason that the nut and bolt-making centers are being flooded with common No. 2 and No. 3 Belgian iron. The demand for best iron is as strong as ever, especially for ship building, cables and railway work. The gas-strip trade is being severely affected by strikes in the tube trade. Labor unrest has never been so prevalent in the Birmingham and South Staffordshire district. For months past, half a dozen works at a time, one group after the other, have been closed down through strikes. At present the tube trade is completely stagnant, owing to a demand by the men for the minimum wage of 23s for unskilled labor, and 10 per cent rise on pieceworkers' wages.

The galvanized sheet trade continues decidedly quiet, with sales at the unremunerative figure of £11 10s. The tin plate trade continues extremely quiet with at least 140 mills idle.

The steel business continues very active, the rail mills both in the north of England and South Wales having plenty of business, but order books are becoming depleted, and the anxiety for the future, combined with constant reductions on the continent are working irresistible effects on the steel market. A meeting has already been arranged to take place in London to consider prices.

GERMAN IRON TRADE

Berlin, May 22.—German metallurgy is not in a too happy condition. The latest information from the iron centers is to the effect that the tendency of the market is the reverse of brilliant. The unwillingness of consumers to commit themselves which has been obvious now for months is assuming a very marked character, and producers find themselves within easy sight of the period when the orders that they have on hand will have been worked up. The prices for finished materials are gradually though continuously shading off; but low prices do not enlist anything like a response from buyers. Steel and bar plates have been the subject of a further reduction on the Dusseldorf market. Bars are to be had in the Rhine Westphalian district at 112-113 marks ($26.32-$26.55½) per ton (2,240 pounds).

Contracts have been renewed for the supply of iron ore to the Silesian factories by the Siegen Mining Syndicate. This is for three years. The terms are very satisfactory for the mine owners both in regard to price and the quantities to be furnished. This would appear to indicate that although the market appears to be in an unhealthy state, there is a thoroughly good undertone.

BELGIAN IRON TRADE

Brussels, May 22.—The statement published of furnaces alight in Belgium and Luxemburg on May 1 shows that out of a total of 55, 52 were alight and three idle. This compares with a total of 50 in 1912, of which 45 were alight and five idle on the corresponding date.

AUSTRIAN IRON TRADE

Vienna, May 22.—The Ungarische Kanonen Fabrik Co., namely, the Hungarian Gun Factory Co., it is projected shall be established in Buda-Pesth, to which end the Hungarian Finance Minister Teleszky has deposited in the chamber of deputies a project of law to facilitate the creation of the establishment. The original capital will be 13,000,000 marks, of which the Hungarian government will take 7,000,000 and the already well-known Skodawerke, of Pilsen, Austria's great arms factory, will take 4,000,000, while 2,000,000 of the capital will be allocated to the Skodawerke as compensation for the experience, management, patent rights, etc., which they will introduce to the concern. The co-operation of Krupps, of Essen, in the conduct of the concern is assured.

RUSSIAN IRON TRADE

Kharkoff, May 21—Some factories have begun to sell pig iron for 1914 at 67-68 copecks (33½-34 cents) per pood of 36 pounds in large parcels. At the present time, factories are busy preparing special iron and steel for tanks and boilers in consequence of the enormous demands on the part of the marine and railway departments. There is a great shortage of crude iron.

MEN OF THE IRON TRADE

JUDGE E. H. GARY, chairman of the Steel Corporation, will sail for Europe about July 2.

ANDREW CARNEGIE sailed from New York last week to spend several months at his Scotland estate.

L. WENK, secretary and treasurer of the United States Reduction Co., South Chicago, recently left for Europe.

T. P. MARSHALL recently retired as superintendent of the stations of the Toronto Electric Light Co., Toronto, Ont.

H. KOPPERS, president of H. Koppers Co., Chicago, builders of coke oven plants, sailed for Germany on June 2.

W. E. BERB has been appointed chief engineer of the Minnequa works, Pueblo, Colo., of the Colorado Fuel & Iron Co.

J. J. STONE has been elected president of the Iron Mountain Mining Co., Duluth, Minn., succeeding William Brown, resigned.

WILLIS N. CONGER has been elected president of the Owego Bridge Co., Owego, N. Y., and Henry Gunn, secretary and treasurer.

THOMAS J. DRUMMOND, president of the Lake Superior Corporation, is seriously ill in the Presbyterian hospital, Montreal, Que.

S. H. CHAUVENET has resigned as manager of the Berkshire Iron Works, Sheridan, Pa. The furnace has been shut down for an indefinite period.

S. F. FORTNER, a foreman of the London Bolt & Hinge Works, Toronto, Ont., employed by that company for a number of years, has resigned.

JAMES R. VANDYCK, of the Vandyck-Churchill Co., New York City, has gone to Europe for a stay of two months in England and on the continent.

G. A. RODMAN, former inspector of bridges for the New Haven & Hartford railroad, has been appointed general supervisor of bridges and buildings.

B. W. PHARIS, recently appointed superintendent of the Erie Engine Works, Erie, Pa., was formerly superintendent of the Canada Foundry Co., Toronto, Ont.

K. GOLDENBERG has resigned his position with the Colorado Springs Iron & Metal Yard Co., Colorado Springs, Colo. Col. L. Silver will manage the business.

G. H. NEUMEISTER was elected president of the Lyons Machine & Mfg. Co., Muskegon, Mich., recently. He will assume active management of the affairs of the company.

W. CRASTS, metallurgist, president of the Crucible Steel Forge Co., Cleveland, has left for an extended tour of Europe. He expects to visit the leading electric steel plants.

R. R. BARRINGER, Tampa, Fla., has resigned from the Georgia Supply Co. and has bought an interest in the Gulf Iron Works, Tampa, of which he has become sales manager.

F. R. ELBERT has resigned as superintendent of Bowes, Jamieson, Ltd., iron founders, Hamilton, Ont., to accept a position with the Ohio Foundry & Mfg. Co., Steubenville, Ohio.

MAXWELL W. SCOTT, formerly with the Commonwealth Electric & Supply Co., Pittsburgh, has been appointed manager of the Penn Machinery & Equipment Co., Oliver building, Pittsburgh.

JOHN N. WILLYS, president of the Willys-Overland Co., Toledo, O., the Garford Co., Elyria, O., and the Gram Motor Truck, Lima, O., has announced the appointment of George W. Bennett as general manager of his interests.

HOWARD JAMES was elected president of the Matoaca Bridge Co., Petersburg, Va., in a recent meeting of stockholders and directors. Dr. J. B. Jones is vice president, William W. Martin secretary and John W. Old, treasurer.

SAMUEL B. SHELDON, recently elected president of the new plant of the Minnesota Steel Co., Duluth, of the United States Steel Corporation, is a well-known steel works manager. His connection for some years as general superintendent of the Lackawanna Steel Co., from 1903 to 1909, especially gained him prominence among the technical executives of the industry. During practically the year of 1909, he was general superintendent of the Saucon plant of the Bethlehem Steel Co. Since that time, he has been a consulting engineer, with his business address at 117 Church street, Bethlehem, Pa. Mr. Sheldon resumes an association with the Steel Corporation of former years. After graduating from the Massachusetts In-

SAMUEL B. SHELDON

stitute of Technology in 1889, where he took a special course in chemistry, he became assistant chemist of the Milwaukee Works of the Illinois Steel Co. From 1890 to 1892 he was chief chemist of the Otis Steel Co., Cleveland, and from 1892 to 1899, superintendent of the Bessemer and open-hearth departments of that company. He then went to the Joliet works of the Illinois Steel Co., where he was assistant general superintendent for two years and then held the position of general superintendent until November, 1903, when he went to the Lackawanna Steel Co. Mr. Sheldon was born in Manchester, Mass., Aug. 31, 1868. He is a member of the American Society of Mechanical Engineers and of the American Iron and Steel Institute.

GEO. W. MOORE, president of the newly organized Reading Casting Co., Reading, Pa., is well known in foundry circles, having, for 15 years, occupied a responsible position with the J. W. Paxson Co. of Philadelphia. H. Claude Bell, secretary and treasurer of this company, was formerly sales manager of the Stanley G. Flagg Co., of Stowe, Pa.

E. B. ROUSE, recently appointed superintendent of the Lawrence Foundry Co., Montreal, Ont., was formerly foundry superintendent of the casting shop operated by the Canadian Fairbanks Co., Sherbrooke, Que.

R. M. BUNDY, who has been associated with Frank L. Crobaugh, Cleveland, for the past 15 years, in chemical and metallurgical work, has been named treasurer and manager of the newly organized Frank L. Crobaugh Co.

C. T. FAIRBAIN, southern manager of the Republic Iron & Steel Co., is rapidly improving from injuries received in a recent automobile accident, and expects to return to his office at Birmingham within the next few weeks.

JOSEPH CHIDLEY, assistant superintendent of motive power of the Lake Shore & Michigan Southern railroad, advises that H. W. Gardner has been appointed supervisor of materials with headquarters in Cleveland, to succeed F. H. Hanson, promoted.

FRANK REID, formerly in charge of the foundry department of the Northern Engineering Co., Fort William, Ont., will engage in business for himself in St. Catherines, Ont. Before joining the Northern Engineering Co., Mr. Reid was employed by the Copp's foundry.

W. R. SWEANEY has been engaged to succeed Parker Kemble as sales manager of the Toronto Electric Light Co., Toronto, Ont. The appointment was made by General Manager Fleming, of the Toronto Railway & Electric Light systems. Mr. Kemble has moved to Cincinnati.

J. W. H. HAMILTON, of Hamilton & Hansel, consulting engineers, New York City, has gone to Europe for a stay of several months. He will supervise the installation of a Greenawalt sintering plant in Italy and assist in laying out similar plants in other countries.

C. L. DAKE has been appointed assistant professor of geology and mineralogy in the Missouri School of Mines. He has served as instructor in the University of Wisconsin and at Williams College, and has had extensive experience in geological field work in the Lake Superior district.

CHARLES E. CROUSE, general foreman in the bridge department of the Toledo Bridge & Crane Co. for the past seven years, has resigned his position and will return to his former home at Cleveland. Mr. Crouse was presented a handsome silver tea set by his fellow employes last week.

JOHN McHUGH has been appointed assistant superintendent of the Farrell works of the American Steel & Wire Co., succeeding Frank Phillips, who resigned to engage in other business. He has been an employe of the company several years and is president of the Farrell city council.

MORGAN BEVAN, formerly inside superintendent of the Philadelphia & Reading Coal & Iron Co.'s Mt. Carmel district, who was recently transferred to the Gilberton district, was tendered a farewell banquet at the Exchange hotel at Locust Gap, Pa. Mr. Bevan was presented a handsome gold watch and fob.

J. M. KELLER, chief engineer of the rolling mill and special machinery department of the William Tod Co., Youngstown, O., has resigned to become chief engineer of the

Otis Steel Co., Cleveland. He has been succeeded in his old position by Wyman Eston, Pittsburgh, formerly employed by Julian Kennedy, blast furnace engineer.

CHARLES BURGESS, founder and proprietor of the Cyclops Steel Works, Titusville, Pa., has given practically a life study to the making of tool steel, having conducted the works at Titusville for about 30 years, and for many years previous at other places. Although Mr. Burgess has lived the allotted time of man, he is still on the job, active and well.

L. J. HAMMOND, treasurer and general manager of the Strong, Carlisle & Hammond Co., Cleveland, has just returned from a ten weeks' pleasure trip, mainly in southern California. While there Mr. Hammond spent some time with Mr. Thew, president of the Thew Automatic Shovel Co., Lorain O., who owns a large ranch of several thousand acres in the orange belt of California.

WILLIAM KEPPLEMAN, Reading, Pa., who for the past 31 years has been foreman of the Mt. Penn Stove Works, and latterly of the Reading Stove Works, was tendered a farewell banquet by the management of the two companies, at the Imperial Cafe. The dinner was private and the guests were heads of departments and co-workers with whom he had been connected since his advent into the stove industry in 1881. His former employers presented him a gold watch and chain as a token of their appreciation of his long and faithful service. Mr. Keppleman will leave Reading shortly to take up his residence in San Francisco, with his son, Elwood Keppleman, who is with the Pacific Gas & Electric Co.

FRANK V. EVANS, Alabama state examiner of public accounts, has filed his resignation in order to accept a position as accountant for the Tennessee Coal, Iron & Railroad Co., Birmingham, Ala. Mr. Evans has been an examiner for two years. He was formerly a newspaper man, being at one time one of the publishers of the Birmingham *Age Herald* and later edited the *Walker County News* at Jasper. He was also mayor of Birmingham for one term.

W. W. COLEMAN has been appointed sales engineer in the railway sales department of the Edison Storage Battery Co., Orange, N. J. After graduation from the Park Institute at Pittsburgh, Mr. Coleman was employed by the Westinghouse Electric & Mfg. Co., and later was designer for the chief engineer of the Cambria Steel Co. For the past 12 years, Mr. Coleman has been employed in the designing, engineering and construction departments of the Union Switch & Signal Co.

JOHN F. JACKSON, vice-president of the Wisconsin Bridge & Iron Co., Milwaukee, left for South America with officials of the Bethlehem Steel Co., to inspect the new iron mines opened by the Bethlehem interests at El Tofo, Chile, and to design the dock and transportation facilities to be constructed there. Mr. Jackson designed several of the largest ore docks in the world, situated at Duluth and Superior, and Marquette, Mich., and a large number of the coal handling plants in Milwaukee. Mrs. Jackson accompanied him on the trip, which will last about three months.

STANLEY MAYALL, of the Armstrong Machinery Co., was recently elected chairman for the Inland Empire district of the United Metal Trades Association, of the Pacific coast, with offices at Spokane, Wash. Fred Ehlers of the Pacific Iron Works was elected vice chairman and B. B. Truett, of the Hallidie Co., treasurer. For the Oregon district, with offices at Portland, Ore., H. B. Harris of the Harris Ice Machine Co. was elected chairman, Fred Hesse, of the Hesse-Martin Iron Works, vice chairman and H. T. Clark, of the Portland Iron Works, treasurer. For the Washington district, with offices at Seattle, Wash., L. H. Roe, of the Westerman Iron Works, was elected chairman, A. N. Walsted, of the Walsted Machine & Electric Co., vice chairman, and H. T. Hendricks, of the Hendricks Mfg. Co., treasurer.

TRADE NOTES

BALTIMORE, MD.—The Edward Renneberg & Sons Co., which operates a machine and boiler works, has moved into new quarters at Atlantic Warf, Boston street and Lakewood avenue.

CHICAGO.—The Lima Locomotive Corporation, Lima, O., has appointed G. H. Peabody to represent the company in western territory. New offices have been opened at 520 McCormick building.

CHICAGO. — The Scottdale Foundry & Machine Co., Scottdale, Pa., manufacturer of coal and coke-handling equipment, has opened a sales office in the Webster building, in charge of Karl Heim.

CINCINNATI.—The Kaestner & Hecht Co., of Chicago, which manufactures elevators and lifts, will probably soon open an office in Cincinnati, with J. H. Mitchel, formerly with the Otis Elevator Co., in charge.

COLUMBUS, O.—The Hayden Corbett Chain Co. is now running full capacity with a large number of orders on its books.

HOUSTON, TEX.—The Houston Car Wheel & Machine Co. has been reorganized with J. J. Settegast Jr., at the head. George H. Hermann is vice president in the reorganization, Arthur J. Binz secretary and treasurer and Oliver K. Badhley manager. Officers of the company are the directors, with C. S. Settegast. George Doering, formerly in charge of the St. Louis Car Wheel Co.'s foundry, is superintendent.

LORAIN, O.—The American Shovel & Stamping Co. has orders on its books aggregating $750,000.

LOS ANGELES, CAL.—The Nelson Valve Co., Chestnut Hill, Philadelphia, has established a branch office at 415 San Pedro street, where the W. H. Gilbert Sales Co. will act as direct representative for the state of California.

LOUISVILLE, KY. — The United Iron Works Co. has entered suit against Caldwell & Drake for $2,390.39, alleged balance due for material furnished in equipping the refrigerating plant in the hotel Henry Watterson.

MANHEIM, PA.—M. T. Williams, manager of the Bond Foundry & Machine Co., Manheim, Pa., advises that his company is overloaded with orders and that he believes the general condition of business is good, as evidenced by the fact that the company's products are shipped to all parts of the United States.

MARSHALL, MICH. — Property of the New Process Steel has been sold at public sale to Franklin French. The plant had been in the hands of a receiver for 18 months. Efforts to sell it at private sale had failed.

NASHVILLE, TENN.—The Fort Bros. Foundry Co. advises the fire at its plant recently was trivial, the damage amounting to no more than $5.

NAUGATUCK, CONN.—The Naugatuck Malleable Iron Co. has filed a certificate of dissolution.

NEW CASTLE, PA.—Brick buildings on the property of the Carnegie Steel Co., at New Castle are being razed, thus removing the last remnants of the former nail and wire plant.

NEW YORK CITY.—The Murphy Iron Works, Detroit, has moved its New York office from 1871 Hudson Terminal building to 901 Woolworth building.

NEW YORK CITY.—The local office of the Penton Publishing Co., Cleveland, has moved from 1115 West Street building, to rooms 503-504 of the same building.

PITTSBURGH.—The Latshaw Bradley Co., Peoples Bank building, Pittsburgh, has been appointed district agent for the Emery Machinery Co., Bradford, Pa., manufacturer of gas engines and gas driven compressors.

PITTSBURGH. — Charles N. Hays, power plant engineer, and agent for automatic stokers and other power plant equipment, has moved his office to the First National Bank building from the Empire building.

PITTSBURGH. — The Falk Co., Milwaukee, Wis., manufacturer of helical herring bone gears, has opened a branch office at Pittsburgh, in charge of R. M. Rush, 2137 Oliver building, who also is representing the Kerr Turbine Co., Wellsville, N. Y. Within the last two years, the Falk company has built about 40 sets of gears for steam turbine work, including three 1,250-kilowatt sets for the Pennsylvania Salt Co., and last week took an order for two 3,000-horsepower Wuest helical herring bone gears and pinions for engine driven sheet mills for one of the large sheet manufacturers in the Pittsburgh district. This will be the first installation of its kind in America.

ROCHESTER, N. Y.—The W. P. Davis Machinery Co. has recently engaged to carry a line of machines manufactured by the St. Louis Machine Tool Co., St. Louis, Mo.

ST. LOUIS.—The Laclede Steel Co., manufacturer of rail carbon steel bars for reinforcing work, also angles and agricultural shapes, announces the appointment of Theo. Geissmann & Co., Inc., 72 W. Adams street, Chicago, as its sales agents in the Central West.

WEIRTON, W. VA.—D. M. Weir, president of the Phillips Sheet & Tin Plate Co., Weirton, has bought 19 acres in the new town of Weirton for a building company which has closed a contract for 25 six-room houses, equipped with all modern conveniences, to be built immediately. A Baltimore concern is seeking particulars with a view to moving its plant to Weirton on account of cheap fuel in the Pittsburgh district.

WORCESTER, MASS. — The Anthony Screw Co. has filed a petition in bankruptcy, liabilities $28,134 and assets $25,939.

NEW BUSINESS

Summing up the business done and the prospects open in the machinery market at the close of May, the results are more favorable than at this time last year. The large interests continue to refrain from stocking up, buying only such single tools or small lots as are needed from time to time, but there is a sense of satisfaction in the probability that during these normally quiet weeks, legislation which is believed to have had a retarding influence will be disposed of and the market will again become lively. The scarcity of large lists from railroads is especially noticeable. Bids are going in on the government inquiry, which will run into the hundred thousands of dollars.

In New York, machinery trade sentiment appears to be better than the actual sales of the week would appear to justify. Orders, in the main, were for single or small lots of apparatus and these did not aggregate as large as during preceding weeks. Dealers, however, are accustomed to inactive business at this period. Local railroad and industrial corporations bought a few machine tools, some of which were heavy machines and helped to swell the value of sales. The Pennsylvania railroad and General Electric Co. were the most prominent purchasers. It is expected that the Lackawanna Railroad Co. will distribute orders on the list of shop equipment now before the trade, very shortly.

In Chicago, the volume of machinery business transacted during the past week has been considerably less than the average, but the rate at which inquiries were received showed no change from previous conditions. A very good number of inquiries, calling for one or two tools, are widely distributed. The greater part of the Santa Fe requirements has been covered, purchases being split up among a number of sellers. Considering the condition of the market in general and the disposition of buyers to hold off, local dealers expect comparative quiet for some weeks.

In Cleveland, the machinery and machine tool dealers generally report a larger aggregate of business for the past month than during April. There were no large inquiries out at any time during the month, and, as is the case at the present time, there was no particular cause to expect a very lively market; nevertheless, the returns for the month were very satisfactory. The inquiry put out by the Central Ohio steam shovel interest was entirely closed last month. There is no large inquiry before the market, although dealers express themselves as believing the present month will show up as good as the month of May. The second-hand machinery market is brisk.

In Cincinnati, there is practically no change in the machinery situation. The market is quiet, and orders are scattering and usually for single machines or tools. This condition has prevailed for several weeks, with the outlook uncertain. Business among the machine tool manufacturers is not very evenly divided, as some of the shops are fairly busy, while others are barely running. Mixing machinery is still the best in demand, and local plants manufacturing this kind have received enough orders recently to keep them running several months.

ALABAMA

ANNISTON.—The Union Foundry Co. recently completed an addition to its plant, adding about 10,000 feet of floor space.

BIRMINGHAM.—The two plants of the Woodward Iron Co. at Bessemer will be in operation by the middle of the summer.

BIRMINGHAM.—The American Radiator Co.'s $300,000 plant at North Birmingham, will be completed, it is thought, before Aug. 1. Contractors now are rushing work.

BIRMINGHAM.—The Birmingham Railway, Light & Power Co. recently announced that it would construct a $50,000 electric power line through Lewisburg and Kimberly to Sibleyville, for the distribution of electric energy to coal mines.

NEW DECATUR.—The Decatur Cornice & Roofing Co., Inc., New Decatur, advises it completed some time ago a foundry and a plant for making miscellaneous iron work such as stairways, fire escapes, balcony railings and elevator inclosures. The newest line of the company is ornamental light posts.

ARIZONA

PRESCOTT.—The Wymazona Mining & Milling Co. has been incorporated to erect and operate mills for the treatment of ores, etc.; $100,000; by H. R. Palmer, E. L. Wingard, F. C. Foote, N. B. Cozby and Geo. Griffith.

ARKANSAS

GREEN FOREST.—The Green Forest Milling & Elevator Co. is installing an electric light plant. J. Villines, president.

HOT SPRINGS.—The Blodgett Construction Co., Kansas City, Mo., has been awarded the contract by the Memphis, Dallas & Gulf railroad, for the construction of a bridge across the Ouachita river, length 612 feet.

PINE BLUFF.—An issue of bonds for the construction of a free bridge across the Arkansas river near Pine Bluff is being considered by the Jefferson County Free Bridge District.

CALIFORNIA

ESCONDIDO.—An issue of bonds to the amount of $100,000, for the installation of a municipal water system, will be voted upon soon.

BERKELEY.—Plans for the establishment of a high-pressure water system for fire protection will be voted upon soon. City Engineer J. J. Jessup estimated the probable cost of this system at $700,000.

LONG BEACH.—B. C. Paul is planning to erect a foundry, 40 x 130 feet, for bronze, brass and aluminum work.

LOS ANGELES.—The Commercial Engine Co. is planning to erect two steel factory buildings on a site near Ninth street and Santa Fe avenue, the main building being 90 x 160 feet, and the other, an office building, being 40 x 120 feet. The Baker Iron Works has the contract for the structural steel work.

ROSEVILLE.—A movement in favor of a municipal water system has been started.

SAN FRANCISCO. — The Read & Son Machinery Co. has been incorporated; $25,000; by D. W. D., W. D. and N. A. Read.

SAN FRANCISCO.—Bids for furnishing between 6,000 and 7,000 tons of steel, to be used in the construction of the new city hall, will be opened by the board of public works, on June 11. The estimated cost of the steel to be used is in the neighborhood of $500,000. Delivery will be expected to start in July, in order that work on the erection of the steel frame may begin sometime in August.

COLORADO

DENVER.—A bond issue of $260,000 has been voted for the construction of the Col-

fax-Larimer viaduct, in Denver.

OURAY.—The Brown Mountain Smelting Co. has completed a smelter near here and will start operations soon.

PUEBLO.—The Colorado Fuel & Iron Co., Pueblo, will build three additional open-hearth furnaces to cost $500,000.

PUEBLO.—The Pueblo Foundry & Machine Co. has been reorganized under a new management and has renewed operations along previous lines, handling iron, brass and aluminum castings and machine, boiler, forge, pattern and architectural iron work.

CONNECTICUT

BRIDGEPORT.—The Otto Machine Co. has been organized with a capital of $5,000; by Harry F. Mitchell, E. R. Green, W. A. Smith and F. J. Smith.

BRISTOL.—The Dunbar Bros., manufacturers of oil-tempered springs, advise that they have recently completed an addition to their hardening shop and a new rolling barrel department.

GROTON.—The town council is considering plans for the installation of additional equipment in the municipal electric light plant.

HARTFORD.—The Seymour Iron Foundry Co. has been incorporated with a capital of $2,000.

HARTFORD.—The Hartford Drop Forge Co. has been incorporated to manufacture iron and steel implements and tools; $50,000; by C. F. Dickenson, M. F. James, E. C. Abbe and A. W. Johnson.

HARTFORD.—The board of water commissioners will receive bids until June 16, for the construction of seven and one half miles of pipe line in the towns of Farmington, Avon and Burlington.

DISTRICT OF COLUMBIA

WASHINGTON.—Proposals will be received by O. Wenderoth, supervising architect, treasury department, for the construction, complete, with mechanical equipment, for the United States post offices at the following points: Greenville, N. C.; New Bedford, Mass., and Plattsmouth, Neb.

FLORIDA

LEESBURG.—The Leesburg Ice Co. is contemplating the installation of additional equipment to double the capacity of its electric light plant.

IDAHO

ASHTON.—The Ashton & St. Anthony Power Co. has been organized with a capitalization of $250,000. The company will build a power plant near here. The board of directors is made up of A. Whitten and L. M. Capps, Blackfoot; N. N. Holm, Shelley; N. D. Jackson, St. Anthony; E. M. Harris, Marysville; J. Harshbarger, and H. C. Graves, Ashton.

BOISE.—It is reported that a company to be capitalized at $40,000,000, will apply for state incorporation soon, for the purpose of constructing and operating a line of railroad from Boise to Winnemucca, Nev.

NEAL.—The Homestake 10-stamp mill belonging to Geo. F. Roth, Rochester, N. Y., was destroyed by fire. Will be rebuilt.

TWIN FALLS.—The contract for building the dam across Snake river at Salmon Falls has been awarded to Slick Bros., Boise.

TWIN FALLS.—The bridge being built by the Oregon Short Line over Rock creek, at this place, is rapidly nearing completion, and preliminary work is progressing on the construction of an 80-foot steel tower coal chute.

ILLINOIS

AURORA.—The Independent Pneumatic Tool Co. has increased its capital stock from $500,000 to $3,000,000.

CHAMPAIGN.—The Fitted Steel Sash Works advises it has taken over the Kelso & Hill Bros. plant and equipment. The plant has 25,000 square feet of ground floor space. The company makes fitted steel sash with a mitered joint.

CHICAGO.—The Indiana Car & Equipment Co. has increased its capital stock from $12,000 to $30,000.

CHICAGO.—The American Mason Safety Tread Co. has moved its Chicago offices to 1214 Peoples Gas building.

CHICAGO.—The Modern Auto Starter Co. has been incorporated to manufacture automobile accessories; $10,000; address in care of Menz I. Rosenbaum, 7 S. Dearborn street.

CHICAGO.—The Auto Sheet Metal Works, 2228 Michigan avenue, recently moved into larger quarters at 1532 Michigan avenue, where it has a floor space of approximately 10,000 square feet.

CHICAGO.—The National Bed Spring Co., previously located at 900 W. Thirty-first street, has moved to 2738 Hillock avenue, where a new plant with a floor space of about 6,000 square feet has been established.

CHICAGO.—The Advance Spring & Wire Co., now located at 223 S. Wood street, is building a new plant at 1749-55 Carroll avenue and expects to move into the latter in a very short time. The building is 40 x 125 feet, two stories.

CHICAGO.—A permit has been granted for the erection of a one-story factory building at 1721-35 Armitage avenue for the W. W. Wilcox Co., now located at 318 W. Superior street. The building will cost approximately $26,000. Highland & Green, architects.

EAST MOLINE.—The Moline Scale Co. has awarded the contract to Henry W. Horst for the construction of three additional buildings. The sum involved is approximately $20,000.

MATTOON.—The Louden Packing Co. is erecting a one-story factory building, 50 x 120 feet, at this point. J. G. Dryagh, 616 Trust building, Terre Haute, Ind., is architect.

QUINCY.—The Electric Wheel Co. has built a machine shop, 70 x 120 feet, as an addition to its present plant. Its erection was necessitated by a large demand for special wheels which require extra machining.

ROCHELLE.—The Geo. D. Whitcombe Co., manufacturer of gasoline motors for mining purposes, recently moved into a new plant.

SPRINGFIELD.—The Board of Aministration, Capitol building, will receive bids until June 9, for the construction of a 50,000 gallon capacity steel tank at the Peoria State hospital, South Bartonville.

STERLING.—The Charter Gas Engine Co. has recently received a large number of orders for gas engines, including a 100 horsepower engine to operate a planing mill at Lexington, Ky., an 80-horsepower engine to operate an irrigating pump in Texas, a 70-horsepower engine for operating a rice irrigating plant in Texas, a 60-horsepower engine for operating a dredge in Iowa, a number of 20 and 25 horsepower engines for operating ensilage cutters in Wisconsin, and a large number of engines to railroads for operating pumping outfits.

INDIANA

BRAZIL.—Crawford & McCrimmon have broken ground for the erection of a large machine shop at this place.

INDIANAPOLIS.—The Cole Motor Car Co. has increased its capital stock from $500,000 to $1,000,000.

INDIANAPOLIS.—The Indianapolis Light & Heat Co. advises the new building it is erecting is an addition to the main power plant. A quantity of generating apparatus and accessories is to be installed.

INDIANAPOLIS.—The Merchants Light & Heat Co. has been authorized to purchase the property and franchise of the Peoples Heat & Light Co., for $525,000. The Merchants Heat & Light Co. has asked permission to increase its capital stock from $1,200,000 to $1,500,000.

KOKOMO.—The Apperson Automobile Co. is taking bids for the erection of a three-story factory building to cost $20,000.

LAWRENCEVILLE.—This city has bought from the Harrisburg Foundry & Machine Co., Harrisburg, Pa., an engine to drive a 100-kilovolt-ampere generator.

LOGANSPORT.—Bids will soon be advertised for the construction of four bridges, specifications covering both steel and concrete, aggregating $100,000. Plans are now ready.

MARENGO.—The board of trustees has plans for a ventilating and heating system for the high school building, and will let a contract for the equipment in the near future.

MUNCIE.—The Delaware Brass & Aluminum Co. has been incorporated to sell and manufacture brass and aluminum castings and other products; $10,000; by John Beckett, P. J. Casey, Charles Beckett and C. Bowers, all of Muncie.

SHELBYVILLE.—The county autditor recently placed an $80,000 bond issue, which will be used for replacing bridges and improving highways in different parts of this county.

IOWA

CEDAR RAPIDS.—The Frank Stary & Sons Foundry, through the assistance of the Commercial Club, will increase its output by additional buildings to its plant.

COUNCIL BLUFFS.—A movement is on foot for an organization to promote the building of a free bridge across the Missouri river, near here.

DUBUQUE.—Morrison Bros., Inc., advise that they are considering a 50 x 100-foot addition to their plant, contract for which has not yet been let.

MT. AYR.—The city council has adopted the report of the engineer employed to make a preliminary survey and prepare plans for a municipal water works and sewer system. Estimated cost $60,000.

WATERLOO.—It is reported that the Waterloo Drop Forge Co. is planning to move its business and equipment to Waverly.

WATERLOO.—The Citizen's Gas & Electric Co. has plans under way for the erection of a new building at an approximate cost of $750,000.

WATERLOO.—The Westfield Metal Foundry was recently opened to manufacture brass, bronze and aluminum castings. H. L. Wheelock and J. G. Penne, managers.

KANSAS

JETMORE.—On June 7 the city will vote on a bond issue for the installation of an electric light and water system to cost $10,000.

LEAVENWORTH.—Fire at the plant of

the Great Western Mfg. Co. here recently, caused a loss of several thousand dollars.

MANHATTAN.—The Sunflower Mfg. Co., whose plant has been closed for some time on account of the company's financial difficulties, has been re-organized and operations will start soon.

NEODISHA.—The Standard Oil Co. has just completed a new boiler, tank and machine shop at this point. Most of the equipment was furnished by Joseph T. Ryerson & Sons, Chicago.

SALINA.—The Self-Contained Plow Co. is planning to erect a plant at Salina.

WICHITA.—A company has been organized at Wichita for the purpose of building a 1,000,000 bushel wheat elevator by C. L. Davidson, Paul Noble, et al.

WICHITA.—Plans for a new hotel to be known as the "Travelers", eight stories, to cost $500,000, are completed and contracts will probably be awarded soon.

WICHITA.—Plans have been drawn for a new seven-story hotel at Topeka avenue and Williams street. Among those interested are L. M. Crawford, H. Samuels and S. J. Smalley.

WICHITA.—The Western Iron Foundry Co., 702 East Second street, is installing new machinery, including six lathes, drop hammer, key seater, sensitive drill and planer. All of these will be operated by individual motor drives.

KENTUCKY

COLUMBIA.—The fiscal court at Columbia will receive bids June 18, on the construction of a steel bridge over Green river at Watson.

HENDERSON.—The Henderson fiscal court has awarded a contract to Harry Bros., of Newport, Ky., for 1,692 linear feet of metal culverts.

HENDERSON.—The Vincennes Bridge Co., Vincennes, Ind., has received a contract from the fiscal court at Henderson, for the construction of seven bridges. The Attica Bridge Co., East St. Louis, Ill., got a contract for three, and the Champion Bridge Co., Wilmington, O., was given a contract for two.

LEXINGTON.—The Central Concrete Construction Co., of Lexington, has the contract for the construction of a reinforced concrete viaduct over Jefferson avenue. The contract was awarded by the Louisville & Nashville railroad at Louisville, involving $64,000.

LOUISVILLE.—The sawmill of the Wood Mosaic Co., of New Albany, Ind., was burned May 30, with $60,000 loss. The plant probably will be rebuilt. Address W. A. McLean, New Albany.

LOUISVILLE.—The Louisville Railway Co. is in the market for machinery to equip its large car repair shops at Twenty-ninth and Broadway. Helm Minary is in charge of the purchases.

LOUISVILLE.—Plans have been completed for the new cooper shop of J. Schwarzwalder & Son, and woodworking and power machinery will be purchased by the company. Arthur Herb is general manager.

PADUCAH.—The Kentucky & Illinois Railroad Co., which was formed for the purpose of constructing a railroad bridge over the Ohio river at Metropolis, Ill., will let a contract this month, it is announced, so that work can begin July 1. W. J. Hill, Paducah, is president of the company.

PIKEVILLE.—The fiscal court at Pikeville, has decided to build a bridge over the Tug river at the mouth of Peter creek. The contract will be awarded in the immediate future.

ROCKPORT.—The Rockport Coal Co. will build a water system and install an electric light plant, having been awarded franchises covering those services by the municipality.

SOMERSET.—The Cincinnati, New Orleans & Texas Pacific Railway Co. has authorized the expenditure of $165,000 for the enlargement of the railway shops at Somerset. These shops employ 600 men at the present time, while the additions will provide for an increase to 1,000.

MARYLAND

ROCKVILLE.—Montgomery county commissioners are planning to construct a water works and sewer system at Silver Spring, at a cost of $25,000.

MASSACHUSETTS

BOSTON.—The plant of the N. E. Iron Works, South Boston, was burned recently, causing a loss of about $35,000. The plant formerly was operated by the Cunningham Boiler Co.

SALEM.—The Boston Bridge Co. is installing a 15-ton traveling crane at the plant of the Eagle Iron Foundry.

SPRINGFIELD.—The Wason Mfg. Co., Brightwood, suffered loss in its foundry recently to the extent of approximately $2,000.

TAUNTON.—R. E. Warner is planning to build a plant here for the manufacture of stoves, to replace the one destroyed by fire several months ago.

WALTHAM.—The Non Corrosive Metal Co., which recently moved to this city and into one of the new factory buildings constructed by the Waltham building association on Bacon street, reports a considerable increase in its business. This company makes bronze memorial tablets and name plates of all kinds.

WALTHAM.—The W. H. Nichols Machine Co. received an order recently from the United States government sufficient in size to require the service of the entire plant for one year. This company does a machine manufacturing business. It has just completed and moved into a new thoroughly up-to-date saw-tooth-roof building on Woerd avenue.

WALTHAM.—The Metz Co., manufacturer of automobiles, is building an addition to its present plant containing 90,000 square feet of floor space. Last year, this company added 26,0000 square feet of floor space to its plant. The present volume of business is the largest enjoyed in the history of this company, as shown by the fact that every department is being operated to its greatest producing capacity at the present time, and both day and night shifts are working.

MICHIGAN

ALMA.—The Alma Standard Foundry Mfg. Co. has been incorporated with a capital stock of $45,000.

BAY CITY.—The M. Garland Co., of this city, is manufacturing special machines for creosoting wooden blocks for paving purposes.

CHELSEA.—The Chelsea Products Co. has been organized to manufacture bolts, nuts and kindred articles. C. Lehman and M. J. Dunkle are behind the project and have leased part of the Mack building. Machinery is being installed and it is expected the plant will start by July 1.

CRYSTAL FALLS.—The Bates Iron Co. has increased its capital stock from $500,000 to $1,000,000.

DETROIT.—The Wahl Motor Car Co. has been incorporated to manufacture motor cars; $85,000; by A. M. Dodge and W. J. Hickesch.

DETROIT.—The Monarch Parts Co. has engaged in business to manufacture autos and auto parts, with a capital of $50,000.

DETROIT.—The Clipper Belt Lacer Co. expects to let a contract within a month for the erection of an addition to its plant that will double its present capacity. Charles P. Foote is president.

DETROIT.—The Castle Lubricating Co., of New York City, has opened a branch for Michigan at 882 Woodward avenue, Detroit, and appointed G. H. Yeats as branch manager.

DETROIT.—The Diamond Brass Works has been incorporated with a capital of $10,000. The company will manufacture metal specialties. E. J. Shaw and W. L. Abate are the chief stockholders.

DETROIT.—Construction has been started on a two-story train shed of brick and steel, 400 x 1,700 feet, being built by the Detroit River Tunnel Co., betwen Fifteenth and Sixteenth streets. According to the George A. Fuller Co., the contractor, the new shed will cost $700,000.

DETROIT.—The Russell Steel & Foundry Co. has been awarded the contract for the steel needed for the new machine shop to be erected for the Detroit United Railway, in Highland Park. The W. E. Wood Co. was granted the general contract and the New York Blower Co. the contract for heating. Smith, Hinchman & Grylls, architects.

GRAND RAPIDS.—The Grand Rapids Steel Forging Co., recently organized, is now operating.

GRAND RAPIDS.—Behler & Cox are building a one-story factory building at Ionia avenue and Fairbanks street N. E., for their sheet manufacturing department. The building will be 50 x 100 feet.

IONIA.—The Ypsilanti Reed & Rattan Co., which has completed a new factory building, 75 x 400 feet, three stories, finds that its business will need more room so will add two more stories, giving it a total of 180,000 square feet of floor space.

MARQUETTE.—The Lake Shore Engine Works advises that it has recently installed an electric traveling crane manufactured by the Pawling & Harnishfeger Co., two motor-driven Prentice lathes purchased through Joseph T. Ryerson & Sons Co., Chicago. One of these two lathes is 18 inches x 12 feet, and the other 18 inches x 30 feet. The company has reported a splendid business at the present time, and advises that it is looking forward to some contracts of considerable importance.

SAGINAW.—The Wickes Bros. Co. has installed four water tube boilers for the new mill plant of the Marshall-Butters Lumber Co., at L'Anse, each having a capacity of 250 horsepower.

MINNESOTA

INVERGROVE.—The Rock Island railroad recently started the erection of a new roundhouse and repair shop at this place, which are estimated to cost $150,000.

ST. PAUL.—Reports state that the Illinois Steel Warehouse Co., a subsidiary of the Illinois Steel Co., has purchased 800 feet on the north side of University avenue, west from Eustis street, upon which it plans to erect a $240,000 warehouse to be used as a northwest distributing point of United States Steel Corporation products.

MISSISSIPPI

HATTIESBURG.—The city is planning the extension of its water mains two and one

fourth miles, at a cost of $7,000. J. H. Putnam, city engineer.

JACKSON.—The municipal commission recently awarded the contract to a Chattanooga concern for approximately $45,000 worth of 20-inch and 24-inch pipe, to be used in the extension of the water-works system, preliminary to the construction of the new filtration plant.

PORT GIBSON.—A 150-horsepower water tube boiler will be installed in the municipal electric light plant. H. D. Brownlee, superintendent.

RICHTON.—A $10,000 bond issue for water-works installation will be voted upon June 10.

MISSOURI

HANNIBAL.—A $285,000 bond issue for the purchase of the present water works system will be voted upon July 1.

ST. LOUIS.—The Wallace Automatic Bolt & Rivet Machine Co. has been incorporated to manufacture, sell and deal in automatic riveting machines and accessories; $100,000; by J. T. Wallace, St. Louis.

ST. LOUIS.—The Pauly Cell Construction Co., St. Louis, has bid $59,997 for installing steel cells in the city jail that is to be erected south of the city hall. An appropriation of $75,000 has been made by the municipal assembly for the work.

ST. LOUIS.—The City Water Co. of East St. Louis has started work on improvements to cost $1,000,000, which will enable the company to furnish water to Granite City, Venice and Madison, Ill., all of which have been supplied by a separate water plant at Granite City. The company intends to lay pipes to Dupo, Columbia, Waterloo and other towns along the East St. Louis, Columbia and Waterloo railroad. The improvements under way include the establishment of two intake tunnels from the Mississippi river, an intake tower in the river, above high water mark, two pumps with a capacity of 10,000 gallons each every 24 hours, an additional concrete filter basin with a capacity of 30,000,000 gallons, and three clear water basins of 30,000 gallon capacity.

NEBRASKA

CRAWFORD.—A. O. Scudder, of Indianapolis, has purchased the S. W. Carey machine shop and foundry here, and is planning several improvements and additions in order to extend the manufacture of brass, aluminum and iron castings.

OHIO

ALLIANCE.—The Fort Pitt Construction Co., Pittsburgh, has been awarded the contract for the Fifth avenue crossing bridge, calling for approximately 200 tons of steel at $2.67 per houndred pounds.

ASHTABULA.—The Phoenix Foundry & Machine Co. recently cast a wheel weighing 8,800 pounds for the Great Lakes Engineering Co.

BATAVIA.—The American Milling Machine Co., Batavia, has been incorporated to manufacture milling machines and machine tools. The capital stock is $10,000, but it is understood it will be increased soon. P. F. Jamieson, of Batavia, is one of the principal incorporators.

BUCYRUS.—The Blower Co. has purchased the old Shunk foundry, which will be equipped after additions costing approximately $24,000 have been constructed.

CINCINNATI.—The Warner Elevator Co. advises that it will not build an administration building to its plant on Spring Grove avenue as reported.

CINCINNATI.—The Kaestner & Hecht Co., Chicago, has secured the contract for six elevators to be used in the new Cincinnati and Suburban Bell Telephone building, now being erected at Fourth and Hammond streets, Cincinnati.

CINCINNATI.—Thomas J. Nichol & Co., Pearl and Ludlow streets, Cincinnati, advises that it has purchased property at Plum and McFarland streets, Cincinnati, which it intends to improve within a year or so by the erection of a factory building that will cost about $30,000.

CINCINNATI.—G. A. Schacht and William V. Schacht, formerly manufacturers of the Schacht motor car, Cincinnati, have leased the old plant of the C. R. Talbott Co. at Straight and Spring Grove avenue, that city, and will engage in the manufacture of a light auto truck soon. The business will probably be extended to a large extent within the near future. New equipment will be installed as soon as possible and active work begun.

CINCINNATI.—It has been decided to make the new Gwyne building, Cincinnati, entirely fireproof. There will not be any wood used in either the floors or walls throughout the building, which will be 12 stories, 60 x 160 feet. Each floor will contain about 10,000 square feet of space and the building will be located at Sixth and Main streets, Cincinnati. It will require about 1,800 tons of steel. Contracts for it have been let for some time and previously reported in these columns.

CINCINNATI. — The Birmingham Metal Products Co., Birmingham, Ala., advises that it has decided not to move its plant to Cincinnati as was reported. The company is, however, establishing a factory at Portsmouth, O., which will be known as the United States Sheet & Metal Culvert Co., which will manufacture a butt-joint corrugated metal culvert in connection with other metal products. The southern business of the firm will still be handled from Birmingham by the Birmingham Metal Products Co. and a plant will also be continued in Memphis, Tenn.

CINCINNATI.—The American Tank & Pump Co., Cincinnati, advises that it has taken out articles of incorporation with a capital stock of $50,000 as the initial start. The company will manufacture self-measuring pumps and all-metal tanks which were formerly manufactured by the American Oil Tank & Pump Co. The factory for the time being will be located in Dayton, O., and the general offices in Cincinnati. The officers of the new concern are as follows: President, A. C. Davis; vice president, Amos Lint; sales manager, P. E. Studebaker; general manager, W. F. McCloud; and superintendent, J. P. Davis.

CLEVELAND.—The Cleveland Ball Bearing Co. has been incorporated; $10,000; by Henry Merkel, G. N. Merkel, P. J. Probeck, W. A. Crawford and C. H. Warner.

CLEVELAND.—The Columbian Hardware Co. has been incorporated; $500,000; by H. L. Parmenter, H. A. Beckett, P. A. White, L. C. Spieth and O. C. Brooman, all of Cleveland.

CLEVELAND.—The Atlas Car & Mfg. Co., which recently sold its plant on Lake street to the Willard Storage Battery Co., is rapidly moving its equipment to the new plant at Collingwood. A gas engine, air compressor and motors are being added to the equipment. Further details not available. R. S. Richards, purchasing agent.

COLUMBUS.—T. F. Thurman was recently appointed receiver of the Ohio Portable Coupler Co., upon the application of Meldrum Gray.

COLUMBUS. — Sealed proposals for the purchase of eight boilers, 18 feet long with 44 4-inch flues, together with accessories, located at the west side pumping station on West Spring street, will be received by the director of public service until June 10. S. A. Kinnear, director.

DELAWARE.—The Delaware Bridge & Iron Co. has been awarded the contract for the superstructure of the Mill creek bridge.

LEIPSIC.—There is a rumor current in this city that the shops of the C., H. & D. railroad will be removed to this place from Dayton, O., in the very near future. The rumor, which has not been denied, comes from an apparently reliable source.

LIMA.—Proposals will be received until June 16 for the materials and equipment for the machine shop building at the Lima state hospital, in accordance with plans prepared by Frank L. Packard, architect, Columbus, O. Proposals are to be sent to George E. Whitney, care of Frank L. Packard, Columbus, O.

MARIETTA.—A. T. Nye & Son Co., stove founder and manufacturer, advises that it is not contemplating any improvements or installing any equipment in its plant at the present time, as the flood last March has entirely altered plans for improvements.

McCONNELLSVILLE.—The local lighting plant has been purchased by Henry A. Archer and associates of Marietta.

McDONALD.—It is expected the new cinder crushing plant of the Carnegie Steel Co. will be ready for operation by June 15. Its capacity is about 20 to 25 carloads a day.

NEW STRAITSVILLE.—The work of repairing the Bessie furnace here is nearly completed. The incorporation of the Bessie Furnace Co. with a capital of $250,000 indicates an early resumption of business. N. C. Kachelmacher heads the new company.

PAINESVILLE.—The Imperial Brass Foundry Co., located at the old Foyer plant on Chester street, is now in full operation.

PIQUA.—A bond issue of $60,000, will be issued for improvements to the present water works system.

POMEROY.—The K. & M. Railroad Co. is planning an addition to its shops at this place. The new buildings are to be completed in August.

PORTSMOUTH.—The United States Metal & Corrugated Culvert Co., Birmingham, Ala., will build a plant at Portsmouth. A site has been donated by the Portsmouth Steel Co.

SIDNEY.—Bids for one steel highway bridge 100-foot span, over the Miami river at Fort Jefferson, and for a steel bridge two span, each 100 feet, over the Miami river near Sidney, will be opened June 7 by H. T. Ruese, county auditor.

TOLEDO.—The Lewis Foundry Co., 4080 Detroit avenue, was incorporated recently. G. L. Lewis, president and manager of the Lewis Electric Welding & Mfg. Co., manufacturer of auto parts, is the organizer of the new concern. A specialty of medium and light weight high grade iron castings will be made in the new industry.

TOLEDO.—The Toledo Railway & Light Co. will establish a high tension power line around the entire city for furnishing electricity for manufacturing. The building of the line will be started within a month. It will be 28 miles long and is estimated to cost $90,000. The old engines in the Water street power plant are being torn out to make room for the new 15,000-horsepower turbine recently purchased. F. J. Derge, manager.

TOLEDO. — The Great Lakes Dredge & Dock Co. is doing the dredging for the

Hocking Valley Railroad Co. in its dock improvements to cost about $2,000,000. The docks are to be ready for use by June of next year. There are 400,000 yards of earth to be handled in the water and 350,000 yards along the bank. The boilers to be used in the installation will be furnished by the Marine Boiler Co., of Toledo, the steel work will be done by the Toledo Bridge & Crane Co., and the concrete work will be done by the Toledo Builders' Supply Co., and the Toledo Sand & Glass Co.

TROY.—Harry Fuller, consulting engineer, Cleveland, has been engaged by the county commissioner of Miami county to prepare plans for rebuilding the larger bridges of this county, destroyed by the recent floods.

WARREN.—The Trumbull Steel Co. expects to have a part of its new plant ready for operation by June 15. Plans have been approved for a 150-foot addition to the east end of the main building and a 100-foot addition to the tinning house.

WARREN.—W. R. Harrington, clerk board of commissioners, Trumbull county, will open bids June 23 for the construction of a three-span through truss bridge over the Mahoning river near Warren. Plans with the county commissioner and with Engineer Wilbur J. Watson, Leader-News building, Cleveland.

YOUNGSTOWN.—Heller Bros. have been awarded the general contract for the new municipal building. The Otis Elevator Co. will furnish elevators; George E. Webster Co., the wiring; and W. J. School, the vacuum cleaner.

YOUNGSTOWN.—The Youngstown Foundry & Machine Co. advises it has completed a new machine shop, 60 x 200 feet, of the most modern construction. All machine tools have been moved from the old machine shop into the new building, the old building to be used as a pattern shop. An electric traveling crane of 15 tons capacity has been installed. An addition to the foundry, 56 feet long, is being made.

NEW JERSEY

ELIZABETHPORT.—The Diehl Mfg. Co. advises that it is building an addition to its plant on Newark avenue, Elizabethport. Contracts for the new buildings have been awarded.

HACKENSACK.—The Reynolds Iron Co., Paterson, has been awarded the contract for the construction of the bascule bridge at River Edge.

MILLVILLE.—The Owego Bridge Co., Owego, N. Y., has been awarded the contract for the construction of a new draw bridge over the Maurice river at Main street.

NEWARK.—The Atha Tool Co. is planning to erect a factory building at Chapel street and Albert avenue, at a cost of $30,000.

NEW MEXICO

CORTEZ.—The Montezuma & San Juan Railroad Co. has been incorporated to construct a line in the San Juan basin; $4,000,000; by G. O. Harrison, president; William Guillet, vice president; W. I. Myler, treasurer; G. R. Lamb, secretary and general manager.

SANTA FE.—The Otis Elevator Co., a Texas corporation, has been incorporated under the laws of New Mexico, at $50,000.

NEW YORK

BROOKLYN.—The Vulcan Rail & Construction Co. has just moved into a new plant at 237-55 Banker street. The new structure has an area of 47,000 square feet.

BROOKLYN.—The E. W. Bliss Co., Plymouth and Jay streets, Brooklyn, manufacturer of presses and heavy machinery, is taking bids for a new erecting shop, 130 x 200 feet.

BROOKLYN.—The North Side Metal & Machinery Co., Inc., has been incorporated; $3,000; by M. Lehman, 415 Flushing avenue; S. Levine, 416 Flushing avenue, and E. Levine, 321 Hart street, all of Brooklyn.

BROOKLYN.—The Universal Knitting Machine Co., Inc., has been incorporated; machinists, toolmakers, iron and steel converters; $2,500; by J. Broadwin, 281 Ainslie street, and A. Levitan, 230 Meserole street, both of Brooklyn, and A. Lipshitz, 86 East 113th street, New York City.

BUFFALO.—The Erie railroad is reported to be considering the construction of a new steel elevator here to replace the one destroyed by fire recently.

BUFFALO.—The Clark-Banks Foundry Co., Inc., has been incorporated; $10,000; by S. L. Clark, 852 Niagara street, and M. A. Banks and G. I. Banks, both of 1260 West avenue, all of Buffalo.

DUNKIRK.—Improvements at the plant of the Atlas Steel Co. are rapidly progressing. These improvements include the erection of buildings for a rolling mill.

FULTON.—The Dilts Machine Works and the Taylor Bros. Co. Knife Works have been merged. The new organization will be known as the Dilts Machine Works. Capital stock $125,000, and directors, F. B. Dilts, R. W. Bennett, F. L. Saunders, C. C. Benedict and A. S. Page.

NEW YORK CITY.—The Universal Equipment Co., Inc., has been incorporated to manufacture and deal in engines, motors, etc.; $50,000; by George Gray, 339 Atlantic street, Stamford, Conn.; Theo. W. Hatfield, 158 Front street, Newark, N. J.; I. B. Owens, 617 West 143rd street, New York City.

NEW YORK CITY.—The Mellis Lock Nut Co. has been incorporated to manufacture hardware, supplies, etc.; $25,000; by Geo. Mellis, 21 Mexborough avenue, Leeds, Eng.; C. H. Abbott, 29 Broadway, New York City; D. M. Cahill, 15 Butler street, Brooklyn, N. Y.

NEW YORK CITY.—The New York, New Haven & Hartford railroad expects to complete and have in operation by Aug. 1 its new electrical repair shop at Van Nest, Bronx Borough. The new shop represents an outlay of about $650,000, and will be thoroughly equipped to repair any and all the electrical equipment now operated by that road. The plant includes an inspection shed, a repair shop proper, a live vat house, blacksmith shop, store room and a power house. The repair shop proper covers nearly an acre and a half of ground and is two stories high. The power house covers 3,000 square feet and the store house 7,500 square feet. The New Haven now has a total of 99 electric locomotives, besides 23 multiple-unit motor cars.

ROCHESTER.—The Standard Automatic Machine Co. has increased its capital from $50,000 to $150,000. Arthur H. Ingle, president, and Albert T. Bradley, secretary.

SCHENECTADY.—The council has authorized an expenditure of $280,000, for the improvement of the water system.

NORTH CAROLINA

BURLINGTON.—The Piedmont Railway & Electric Co. is considering the construction of a hydro-electric plant between Burlington and Graham, to develop 3,000 horsepower for transmission to surrounding towns.

CHARLOTTE.—The Blake Car Steps Wks. is planning to enlarge its plant at a cost approximating $50,000.

OKLAHOMA

CUSHING.—The Stokes Construction Co. of Oklahoma City, has been awarded the contract for improvements to the water works and sewer systems, which includes furnishing and laying seven and one half miles of cast iron water pipe.

GUTHRIE.—A new steel bridge will probably be built over the Cimarron river at Coyle sometime this summer.

MUSKOGEE.—The Central States Bridge Co., of Indianapolis, has been granted the contract for the structural steel required for the machine shop and main building of the M., O. & G. shops at Muskogee. The main building for machine shop, blacksmith shop, boiler and locomotive shops, will be 148 x 220 feet, 60 feet in height. A car repair shop, 46 x 180 feet, a carpenter shop, 32 x 88 feet and a store room, 52 x 88 feet, will also be erected. The cost of these buildings, together with equipment, is estimated at $175,000. Two traveling cranes of 25 and 100 tons capacity, respectively, will be installed.

HINTON.—D. A. Tolbert, Ada, has been awarded the contract for the construction of an electric lighting plant and water system, at $25,917.

OREGON

AMITY.—The city council is considering plans for a complete water-works system for this city. The plans include a 240,000-gallon reservoir.

EUGENE.—The city council has instructed city engineer to advertise for bids for 15½ blocks of sewers.

EUGENE.—Articles of incorporation have been filed by Oakridge Lumber Co. with a capital stock of $150,000. It was announced that a new plant will be built. Ernest E. Hyland, John Stephenson and Chas. McFarland are the trustees and officers.

PORTLAND.—The city council has awarded contract for furnishing 30 fire alarm boxes to Gamewell Fire Alarm Co. for $112.50.

PORTLAND.—The bid of Stewart Iron Works Co. of $29,792 for furnishing cells and fixtures in new jail has been accepted.

SILVERTON.—The bond issue of $50,000 for municipal water system was defeated at recent election.

PENNSYLVANIA

ALLENTOWN. — The Allentown Boiler Mfg. Co. has recently completed the erection of eleven large steel stacks at the American Steel & Wire Co.'s plant, and are 110 feet high and six feet in diameter. Each stack weighs 12,000 pounds.

ALLENTOWN.—George H. Hardner, of Allentown, has been awarded the contract to erect the large new roundhouse and locomotive repair shop at the Bethlehem Steel Works. The roundhouse will have a diameter of 160 feet and will store 20 locomotives. The cost of these two buildings will be $50,000.

ALTOONA.—The Penn Central Light & Power Co., managed by Day & Zimmerman, of Philadelphia, is planning to erect a large power plant at Williamsburg, and an adminstration building at Altoona. The cost of these improvements is estimated to exceed $1,000,000. The company will install machinery for the generation of approximately 30,000 kilowatts, and make provisions to double that capacity. One turbine generator of

6,000 kilowatt capacity has already been ordered from the Westinghouse Edgemore Iron Co., Edgemore, Del., and some boilers to be equipped with automatic stokers also have been ordered from the same company. The administration building in Altoona will be located at Union avenue and Eighteenth street, and will be 42 x 93 feet, three stories, of brick and steel construction. E. B. Greene, general superintendent, and H. B. Soper, superintendent of power plants.

ASHLAND.—The Mt. Carmel Iron Works has received an order for 2,000 lamp posts for the city of New York.

ATHENS.—T. R. MacDonald, of Scranton, formerly with the Scranton Steam Pump Co., has purchased the foundry and business until recently conducted by Frank Little.

AVONMORE.—The Gibson Motor Car Co., manufacturer of automobiles and commercial gasoline trucks, has completed arrangements and is preparing to erect a plant in Avonmore.

BELLEVERNON.—The Bellevernon Construction Co. has been incorporated; $25,000; by Leroy L. Reeves, Otto C. Sutton, W. A. Mitchner, and S. J. Jones, Bellevernon.

CHESTER.—Activities will be commenced in the near future upon the erection of two new iron tanks for the Crew Levick Oil Co. at the foot of Booth street in the West End. Bids are being received that specify two thirty-thousand barrel containers. The tanks are to cost about $50,000.

CLEARFIELD.—Press reports state that the Newhall Steel Co. has purchased the plant of the Hyde City Steel Co., at Clearfield, and will begin work at once placing it in condition for operation.

DU BOIS.—The Du Bois Iron Works has bought from the Harrisburg Foundry & Machine Co., Harrisburg, Pa., one 375-horsepower and one 2,500-horsepower high speed steam engine to be direct connected to Crocker-Wheeler generators.

MANHEIM.—The Bond Foundry & Machine Co., manufacturer of power transmission machinery, advises that it is building an addition to its plant, 50 x 120 feet, and that the general conditions of its business at the present time are exceedingly good, in fact, that it is overloaded with orders.

PHILADELPHIA.—The International Radiator Co. recently increased its capital stock from $250,000 to $750,000.

PHILADELPHIA.—Albert Doak has been awarded the contract for setting Babcock & Wilcox boilers at the Philadelphia stockyards of the Pennsylvania railroad.

PHILADELPHIA.—The Thos. Devlin Mfg. Co., manufacturer of malleable iron fittings, etc., advises that four or five new buildings have been added to its plant within the past year.

PHILADELPHIA.—Plans and specifications for the reconstruction of the car repair shop of the Pennsylvania railroad at Kearney, N. J., have been prepared. The building is to be of steel and reinforced concrete.

PHILADELPHIA.—The Southwark Foundry & Machine Co. is installing blowing engines, condensing and air pumps and three 3-000 kilowatt generators at the new blast furnaces of the Pittsburgh Steel Co., Monessen, Pa.

PHILADELPHIA.—A building site was recently granted the Quigley Furnace & Foundry Co. for the building of a coal conveyor for the Midvale Steel Co., on the east side of Blabon street, south of Roberts avenue, at a cost of $300,000.

PHILADELPHIA.—Application has been made for the incorporation of the Richard De Cou Co., to buy, sell, manufacture and deal in iron and steel, and other metals. The applicants are I. Edward Bowen, John J. Crowers and Felton H. Middleton, Philadelphia.

PHILADELPHIA.—The five-story building at 9 North Fifth street, lot 28 feet by 114 feet, has recently been conveyed to the Supplee Hardware Co. for a nominal consideration, subject to a ground rent of $2,000, by William W. Supplee. The assessed value of the property is $35,000.

PITTSBURGH.—J. P. Koehler has bought the former Jelly Foundry property on Smallman street, and will build a brass foundry.

PITTSBURGH.—The Wayne Brass Foundry Co. has bought a site on Butler street for a brass foundry.

PITTSBURGH.—Hardie Bros. have bought from George T. Ladd & Co., Pittsburgh, an Alberger gas engine to be direct connected to a 100-kilowatt generator.

PITTSBURGH. — The George J. Hagan Co., Peoples Bank building, Pittsburgh, has taken a contract for sheet pair and annealing furnaces for the Allegheny Steel Co., Brackenridge, Pa.

PITTSBURGH.—The Turner-Fricke Mfg. Co. has sold to H. J. Heinz Co. a 250-horsepower, four-cylinder vertical gas engine to operate the generator in the Heinz Co.'s power plant in the North Side.

PITTSBURGH.—The Westinghouse Electric & Mfg. Co. recently received the following orders: St. Petersburg Investment Co., St. Petersburg, Fla., one 500-kilowatt rotary converter with a 550-kilovolt-ampere transformer; Greenville, Spartanburg & Anderson Railway Co., Charlotte, N. C., (Southern Power Co.) one 300-kilowatt rotary converter and three 100-kilovolt-ampere transformers; the Centreville Light & Traction Co., Centreville, Ia., two 100-kilowatt motor generator sets; the Pittsburgh, Harmony, Butler & New Castle Railway Co., Pittsburgh, two 250-kilowatt rotary converters and one 550-kilovolt-ampere transformer.

POTTSTOWN.—Work was recently started in the railroad link from the Shanesville iron mines to the Schuylkill division of the Pennsylvania railroad. It will cross the Reading railroad tracks at a cut a short distance above Bramcote.

POTTSVILLE.—The Eastern Steel Co. has leased the plant of the Warwick Iron & Steel Co. and is reported to be planning improvements in order to increase its capacity.

READING.—J. G. Speidel, manufacturer of hoists, cranes, elevators, etc., advises that it is crowded with work, but is not contemplating any addition to its plant at the present time.

READING.—The Reading Iron Co. is shipping a large cotton press to Galveston, Tex., which weighs 250,000 pounds. Eight cars will be required to transport the parts of the huge machine.

READING.—The Lewis F. Shoemaker Co., of Pottstown, has awarded the contract for painting 520 tons of steel and 100,000 square feet of corrugated iron to R. F. Davis, Stony Creek Mills, who recently finished painting 39,000 square feet of steel at the Carpenter Steel Works at Reading.

READING.—The Reading Casting Co., a new corporation, has leased the old plant of the Gray Iron Foundry Co., 1144 Mulberry street, used by that firm up to its reecnt removal to West Green and Tulpehocken streets. Improvements to the shop are planned. The new company is making a specialty of light gray iron castings. The officers are George W. Moore, president; Samuel Hallowell, vice president; H. C. Bell, secretary and treasurer.

SCOTTDALE.—The Scottdale Foundry & Machine Co. is being reorganized under the name of the Scottdale Machine & Mfg. Co., of which E. A. Humphries is president. This company manufactures coal and coke-handling equipment. Recent orders received include a coal haul and screening equipment for the Provident Coal & Mining Co., Kelly Station, Pa., a picking and screening equipment for the Gilliam Coal & Coke Co., Gilliam, W. Va., and a conveying and screening equipment for the Glen Alum Coal Co., Glen Alum, W. Va.

SHARON.—Progress on the new sheet mills of the plant of the American Sheet & Tin Plant Co., Sharon, Pa., is being made. Concrete bases for mills and annealing furnaces are practically completed.

SHARPSVILLE.—The borough of Sharpesville, Sidney Martin, consulting engineer, has given to the Westinghouse Electric & Mfg. Co. a contract for an arc lighting system and to B. D. Pendleton, of the Wheeler Construction Co., contract for condensing equipment for the municipal lighting plant.

TITUSVILLE.—The Cyclops Steel Works is contemplating a very considerable increase to the capacity of its works, including an addition of one steel mill and rolling machinery to make sizes and shapes which can not be conveniently made under hammers. Other changes and improvements are also under consideration, but nothing definite has been decided upon. This company specializes on tool steel, both carbon and high speed. Orders have recently been received unsolicited from Costa Rica, England, Denmark and China and other foreign countries. Chas. Burgess, owner and Walter Bould, manager.

WARREN.—The Struthers-Wells Co. advises that it is contemplating some additions to its plant next year, but that reports concerning improvements in this year are erroneous.

WAYNESBURG. — The plant of the Waynesburg Pressed Steel Co., West Waynesburg, was damaged by fire recently. Loss is principally in damage to machinery and through suspension of operations.

RHODE ISLAND

PAWTUCKET.—The William H. Haskell Mfg. Co. has completed plans for the erection of a large addition to its plant, two stories, which, when completed, will give between 20,000 and 30,000 square feet of additional floor space.

PROVIDENCE.—Ground has been broken for the erection of three buildings at the corner of Conant and Pine streets, to be occupied by the Easton & Burnham Mfg. Co. A contract calls for the work to be completed by Oct. 1.

SOUTH CAROLINA

GEORGETOWN.—The Georgetown Gas & Electric Co. has been incorporated; $100,000; by C. Bachman and J. T. Hayden, both of Philadelphia.

TENNESSEE

MEMPHIS.—The Memphis Sheet Metal Works has been incorporated; $50,000; by J. Q. Clarke, T. H. Scott, H. G. Seller and J. A. McDonald.

MEMPHIS.—A vote on a bond issue for the purpose of increasing the capacity of the pumping station will be taken at the order of the city commissioners.

ROCKDALE.—The Variety Iron & Steel Works Co., Cleveland, has taken a contract for steel work and the Louisville Fire Brick Co., Louisville, for brick work at the blast furnace plant of the Rockdale Iron Co. Improvements now being made include four White & Kernan type hot blast stoves 16 x 65 feet; hot blast main, equipped with Scott expansion joint, a draft stack six feet inside diameter and 150 feet high; cold blast main and bustle pipe.

TEXAS

DALLAS.—The Chicago Bridge & Iron Works, with offices in the Praetorian building, has been awarded the contract for the erection of a steel water tower, capacity 50,000 gallons, 100 feet high, by the State Normal Board of Regents, San Marcos.

FORT WORTH.—The Bowdry & McKinley Iron Foundry is planning to move its plant from its present location on South Hemphill street to the north side and erect buildings which will provide for an increased capacity.

LADONIA.—J. A. Bishop & Co. has been incorporated; $15,000; by J. A. Bishop, Grover Bishop and W. W. Bemar.

UTAH

SALT LAKE CITY.—The forge and foundry buildings of the University of Utah, were damaged by fire recently to the extent of about $10,000.

VIRGINIA

SUFFOLK.—The Maxwell Hosiery Mills has increased its capital stock from $10,000 to $20,000, and will build an addition to its plant.

WASHINGTON

ABERDEEN.—Taxpayers have recommended to the city council and that body is considering proposal to build a $2,000,000 hydroelectric plant at headwaters of Wynoochee river.

ANACORTES.—The Chamber of Commerce is offering inducements for the establishment of an iron foundry here.

BREMERTON.—Rear Admiral H. R. Stanford will recommend to navy department the immediate construction of another dry dock.

BREMERTON.—Two bids were received at navy yard for six traveling cranes. Northern Engineering Works, Detroit, Mich., bid $27,650 and Niles-Bement-Pond, 111 Broadway, New York City, $28,700.

CLARKSTON.—The E. D. Hale Co. has been organized for manufacturing a money-changing machine here. The officers are: A. J. Wood, president; C. R. Drake, vice president; W. L. Golden, secretary-treasurer; Fred C. Sittkus, general agent.

EVERETT.—W. B. Wefesnot & Co., Keosauqua, Ia., is consulting with Chamber of Commerce and Motor Boat Club regarding the establishment of a motor boat factory here.

EVERETT.—The following bids were received for steel bridge over Ebey slough at Home acres: International Bridge Co., Seattle, ordinary construction, $30,568, bascule, $30,921; Everett Construction Co., Everett, ordinary construction, $38,605, bascule, $42,173; American Pile Driving Co., Everett, ordinary construction, $39,220, bascule, $40,700.

EVERETT.—The Sumner Iron Works, whose plant was recently destroyed by fire, has agreed to build its new plant in Everett if the citizens will take up an issue of $100,000 special stock which is offered at seven per cent cumulative dividend preferred. At present the company is keeping its business intact by operating a plant in Tacoma, which it rented shortly after its plant here was destroyed by fire. The assets of the company are $200,000 above the amount necessary to pay present indebtedness, but is not available for immediate building purposes.

HILLYARD.—The city council has opened bids for a large amount of 12, 10 and 8-inch water mains and fire hydrants. Contract has not been let.

OLYMPIA.—The contract for installing the underground part of the Lemon Foshay steam heating system has been let to the American Dist. Steam Co. for $50,000.

PUYALLUP.—The city council has been ordered by the town of Sumner to tear up wooden mains under the town and replace with cast iron pipe. A large amount of damage has been caused in Sumner because of leaks. The estimated cost of work is $5,250.

ROCKFORD.—The city council has ordered special election to vote bonds for replacing all wooden water mains with cast iron pipe. Estimated cost $4,000.

SEATTLE.—A new plant on the Tide flats will be established by H. E. Wooley, formerly of Trenton, N. J., for the manufacture of chain, dredges, anchors, etc.

SEATTLE.—The Seattle Construction & Dry-Dock Co. was low bidder with offer of $918,800 for steel submarine for U. S. navy. Contract has been awarded.

SEATTLE.—The foundry of the Westerman Iron Works has been destroyed by fire with a loss of $10,000. The company will rebuild.

SEATTLE.—Announcement has been made that Henry M. Dawes, Charles G. Dawes and Rufus C. Dawes, of Chicago, will establish a coke plant to cost $2,500,000 on Duwamish river between here and Tacoma. The plant will have a capacity of 1,500 tons a day.

SEATTLE.—A plant for the manufacture of a new automobile to be called the "Schram", will be established near Seattle soon, according to reports. A company for the manufacture of this machine was recently incorporated at $500,000; by F. J. Carvery, president; A. J. Schram, designing engineer; W. R. McClelland, treasurer.

SEATTLE.—The Puget Sound Cement & Lime Co. has been incorporated with a capital of $3,500,000. Some of the leading contractors and capitalists are back of the move. The company plans the immediate erection of crushing and screen plants with 2,500 tons capacity on Orcas island, where the deposit is and also a 3,000-barrel semi-wet process mill in Seattle.

SEATTLE.—Michael Earles, of this city, will build a lumber mill with 500,000 feet daily capacity at Port Angeles. The contract for machinery has been awarded to Union Machinery & Supply Co. The entire plant will cost about $1,000,000, according to announcements. The company organized is named Puget Sound Mills & Timber Co., and has 1,800,000,000 feet of timber to cut.

SPOKANE.—The Idaho Continental Mining Co. is negotiating for a loan of $125,000 to make extensions in plant.

SPOKANE.—The Day Automobile Co. of Detroit, is negotiating for site for factory in this city.

TACOMA.—The Tacoma Railway & Power Co. and the city council are dickering on an agreement to build a street car line across the tide flats manufacturing district.

TACOMA.—The city council has passed an initial resolution calling for the laying of 25 blocks of 6-inch cast iron water mains in North Ninth street, Junett street, Cedar street and North Tenth street.

TACOMA.—The Hofius Steel & Equipment Co. of Seattle has closed a 25-year lease for seven lots on Busti street, where a warehouse and storage yard will be located. A. A. Hilton, president, was formerly manager of the Griffin Wheel Works, South Tacoma.

WENATCHEE.—The new foundry recently built and placed in operation here by L. B. Frazier is busy, having orders on its books at the present time sufficient for three months' work.

WEST VIRGINIA

HUNTINGTON.—The Huntington Development & Gas Co. recently consummated a contract with the Norton Iron Works and the Ashland Steel Co., at Ashland, Ky., for supplying fuel gas.

MORGANTOWN.—Samuel S. B. Brady, chief engineer of the Buckhannon & Northern railroad, has arrangements well under way for extending the road from Rivesville to Fairmont, including the construction of a bridge 1,000 feet long, across the Monongahela river at Cawtawba, and the construction of five miles of track on the east side of the river entering Fairmont. Stockholders have appropriated $1,000,000 for this work.

SISTERVILLE.—The McJunkin Machine Co. has been organized to take over the machine shop business of H. A. McJunkin, and is planning to erect a new building.

WHEELING.—The Alloy Steel Casting Co., of Warwood, has been re-organized and will hereafter be known as the Wheeling Steel Casting Co. The company's plant at Warwood, which has been closed during the reorganization of the company, will be enlarged and improved.

WISCONSIN

ALTOONA.—The Omaha Line (C., M., St. P. & O. R. R. Co.) will rebuild its terminal facilities at Altoona, Wis., adding 20 stalls to its roundhouse, one new turn-table, and changing the entire drive of machine shop and other buildings from steam to electricity. L. H. Guion, Minneapolis, is in charge.

ANTIGO.—The Holland Flexible Auto Wheel Co. has been incorporated by John E. McKenna, James Donahue and Thomas Holland to manufacture a new type of wheel for automobiles and motor trucks. The capital is $10,000. A factory will be established.

APPLETON.—The Killen-Walsh Mfg. Co., organized six months ago to build gasoline tractors and other machinery, is now testing out the first models of a 7,000 farm tractor, operated by a 40 horsepower gasoline engine. The tractor is of the caterpillar type, thus being suitable for many purposes. As soon as the tests are completed, preparations for a long factory run will be made. The concern is capitalized at $100,000, and is backed by some of the leading business men of Appleton.

FOND DU LAC.—A new corporation, capitalized at $1,500,000, and taking the same name as the old concern, the Harris Typewriter Co., has been organized by Fond du Lac men who recently bid in the property at foreclosure sale at $60,000. The company was thrown into bankruptcy in March on complaint of the bondholders. The property has been kept intact and will be enlarged. Fred J. Rueping is president.

MANITOWOC.—The Manitowoc county board of supervisors appropriated $27,000 for the construction of steel and concrete bridges, to which fund will be added $9,000 by the state highway commission as state aid.

MANITOWOC.—L. J. Anderson has incorporated the L. J. Anderson Co., capital $20,000, to operate a garage, machine shop, implement distributing station, gasoline engine and tractor business, in the new building he has just completed on Commercial street.

Charles Eberhardy is associated with Mr. Anderson.

MENASHA.—Bart Homan is about to build a $10,000 garage and will purchase a small list of hand and power-driven tools.

MENASHA.—The Walter Brewing Co. awarded the contract for the construction of a bottling house, machine shop and office building to Ulrich & Howmann, of Neenah, Wis., at $12,612. The equipment for bottling house and shop is now being purchased.

MENASHA.—The "Soo Line" and Chicago, Milwaukee & St. Paul railway, which have been operating separate freight and passenger terminals on adjoining acreage at Menasha, are preparing to build a joint or union terminal, double side-track facilities and make other improvements.

MERRILL.—Seventy-five miles of standard gage railway are to be constructed and operated by the Minneapolis, Merrill & Marinette Railway Co., which has just been organized at Merrill with a capital stock of $400,000. The company is already surveying lines from Merrill to Prentice, Wis., and Merrill to Antigo, Wis. The principal stockholders are A. H. Wright, Chris Solum, A. B. Nelson, Fred W. Kubasta, Herman Meyer and J. N. Cotton, all of Merrill.

MILWAUKEE.—The Harley-Davidson Motor Co., motorcycles, is purchasing equipment for factory No. 8, 60 x 83 feet, six stories. A 6,000-pound elevator will be required.

MILWAUKEE.—The Porto Metal House & Garage Co. has been incorporated to manufacture metal houses, etc.; $5,000; by J. E. Tracy, P. G. Meyer and L. P. Weber, all of Milwaukee.

MILWAUKEE.—The Wisconsin Iron & Wire works, Milwaukee, was awarded the contract to manufacture and install 63 ornamental electroliers on Grand avenue viaduct, at $10,000. Vaughn & Meyer, Milwaukee, are the engineers and designers.

MILWAUKEE.—A. N. Becker and two associates have purchased the plant, equipment and good will of the Bayley Mfg. Co., 732-48 Greenbush street, and are conducting the business under the same name, having remodeled the foundry building into a machine shop. The building is 148 x 325 feet and is now equipped for the work of the company in manufacturing fans, blowers, engines, heating and ventilating systems, etc.

OOSTBURG.—The Yale Mfg. & Sales Co. of Oostburg, Sheyoygan county, has filed a voluntary petition in bankruptcy. The company maintains offices at Milwaukee and works for the manufacture of automobile parts, accessories and specialties at Oostburg.

OSHKOSH.—The Dauber-Kratsch Co. has been incorporated to do a general machinery manufacturing business; $25,000; by Chas. G. Dauber, William H. Kratsch and O. Kratsch, all of Oshkosh.

RACINE.—The Racine Roller Window Screen Co., capital $20,000, has been organized by Elnar J. Beck, George Krogstad and F. Iver Beck.

RACINE.—The Racine common council awarded the contract for furnishing two motor-propelled fire engine trucks to the American LaFrance Fire Engine Co., Elmira, N. Y., at $17,000.

RACINE.—W. R. Taylor, A. L. Picker and F. W. Heeter have organized the Racine Detachable Hinge Co., capital $10,000, and are equipping a shop on Washington avenue to manufacture the product.

RACINE.—The Racine Water Co. is preparing estimates for a filtration system to purify the water supply taken from Lake Michigan. The probable cost is $25,000.

SHEBOYGAN.—The Sheboygan common council is investigating with a view to establishing a municipal electric lighting plant. Present service is furnished by the Sheboygan Railway & Light Co.

SHEBOYGAN.—The Pellett & McMullen Co., Manitowoc, was awarded the contract for the superstructure of the new steel bridge across Sheboygan river at New Jersey avenue, at $10,900. The substructure will be executed by the Wisconsin Dredge & Dock Co., Manitowoc, at $7,300.

WAUPON.—The Zimmerman & Son Co., manufacturing buggies, wagons, automobile fittings, etc., has filed a voluntary petition in bankruptcy. The property will be sold at auction on June 9.

WAUWATOSA.—The Shadall Mfg. Co. has been incorporated to manufacture ventilating devices; $10,000; by Chas. E. Shadall, F. L. Homeffer and F. H. Durbin, all of Wauwatosa.

WYOMING

CHEYENNE.—The Glendale Power Co. has been incorporated to build and operate hydro-electric plants; $100,000; by E. G. Heckendorf, P. S. Buckman and J. R. Marine.

YELLOWSTONE PARK.—Bids will be received until June 10, for furnishing the necessary labor and material for the construction of the steel and concrete bridges in Yellowstone Park. Capt. C. H. Knight, United States engineer.

DOMINION OF CANADA

ALBERTA

MACLEOD.—The Canada West Coal Co. has prepared plans for the erection of a $100,000 pressed brick plant at Taber, Alta., with a capacity of 100,000 bricks a day. J. R. Howard, Minneapolis, is manager. Work will start this summer.

MEDICINE HAT.—The Western Sales Co. of Winnipeg, has been awarded a contract for installing a water system at a cost of $50,000, for the Dunmore Development Co. The latter firm has struck a flow of natural gas from which it expects to develop 20,000 horsepower.

BRITISH COLUMBIA

BAMBERTON. — The cement company which is building a million dollar plant here, under the supervision of H. K. G. Bamber, will probably be in the market soon for two steamers for transporting its products.

BURNABY. — The Westinghouse-Church-Kerr Co., of New York City, have been ordered by B. C. Electric Co. to prepare plans for new repair shops to be built at Burnaby.

FREDERICTON.—Searle & Lamson, Ltd., of King street, are asking for estimates on the construction of a refrigeration and cold storage plant.

NEWCASTLE.—The Canadian Gear Works, Ltd., manufacturer of wagon gears and bodies, is planning alterations and additions to its plant.

ST. JOHN.—The McKee Furnace Co., Ltd., has been incorporated to acquire the Canadian right to the McKee fuel saver, manufacture it and offer it for sale; $100,000; by James T. McKee, Fairville, Thomas E. Powers, James S. Tait, and others, of St. John.

TOD INLET.—The Vancouver-Portland Cement Co. is making extensive additions to its plant, which will increase capacity 50 per cent, to 3,000 barrels a day.

VANCOUVER.—The British Columbia Electric Co. is building a new plant at Jordan river which will increase its output by 14,000 horsepower.

VANCOUVER.—The B. C. Brass Works at Sapperton, B. C., has been purchased by the H. & D. Mfg. Co., which will make several important additions, and manufacture two new steel products. John Dobson and T. W. Hartley are the principal members of the new concern.

VANCOUVER.—The Pacific Great Eastern railway, which is building a line from Vancouver to Fort George, recently awarded a contract to Evans, Coleman & Evans, of Vancouver, for 15,000 tons of steel rails, to be delivered between October this year and July of next year.

VANCOUVER.—The Canadian Bridge Co., Walkerville, Ont., has been awarded a contract by the British Columbia government to supply the superstructure for a steel bridge over the Thompson river, at Lytton, costing $80,000. The contract for the substructure and erecting the superstructure went to the Graff Construction Co., of Vancouver.

VANCOUVER.—Engineers are now engaged on detail surveys and estimates for a hydro-electric power plant which will ultimately cost between $12,000,000 and $15,000,000, with a capacity of 300,000 horsepower, for the Campbell River Power Co. This company plans to sell power all through Vancouver Island, transmitted at high voltage, and will, it is said, supply power for the electrification of the Esquimault and Nanaimo railway. Three falls on the Campbell river will be used, work on the first unit to commence during the coming summer. George C. Hinton, of the Hinton Electrical Co., is one of the promoters of the company, which has considerable British capital behind it.

VICTORIA.—The Vancouver Hydro-Electric & Tramway Co. has prepared plans for the construction of 50 miles of tramways on Vancouver Island this summer. Montague Yates is the general manager.

VICTORIA.—The Canadian Pacific railway has announced that it will spend $1,500,000 on the Island system this year. The construction work involves grading, trestle and steel laying over a 40 mile stretch of country while foundations are being constructed for steel bridges over French Creek, Little Qualicum, Big Qualicum, Sable and Trent rivers.

MANITOBA

RUSSELL.—The town council has awarded the contract for an electric light and power plant to the British Engineering & Supply Co., Winnipeg. The price was $18,000.

TRANSCONA.—The John Marsch Co., Chicago, has been sublet the work of constructing 90 miles of trackage in the C. P. R. yards at North Transcona, the contract for which was let to Foley, Welch & Stewart, of St. Paul. Besides the trackage, there are also being built large roundhouses, machine shops and repair shops, this work being in the hands of the Lyall-Mitchell Co. The machine shops will be finished by August, while the construction of the largest roundhouse, which holds 55 engines, is progressing rapidly.

WINNIPEG.—The Monarch Clamp Specialty Co., Ltd., has been incorporated by W.

J. Powell, E. W. Meadows, W. Moffatt and others with $50,000 authorized capital.

WINNIPEG.—The McCoy Process Refrigerating Co., Ltd., has been incorporated by Charles W. McCoy, W. J. Gibson, W. R. Rundle and others, with an authorized capital of $1,000,000 to manufacture refrigerators.

NOVA SCOTIA

SYDNEY.—The program of extension undertaken three years ago by the Dominion Steel Corporation was practically completed last week, when the new blast furnace No. 7 was blown in. All the new works are now in successful operation.

SYDNEY.—The Anglo-Canadian Industrial Trust Co., of London, Eng., announces its intention of erecting a plant here capable of building ships up to 10,000 tons, provided the city will give a free site with water frontage, and guarantee its bonds to the extent of $2,000,000.

ONTARIO

AURORA.—The Positive Clutch & Pulley Works has shipped to Bobcaygeon for the hydro-electric system a pulley 135 inches in diameter with a 20-inch face.

BERLIN.—The Dominion Tire Co., which is erecting a $300,000 plant in the city, will also put up a power house addition at a cost of $50,000.

BRAMPTON.—A gasoline engine factory will be built in Brampton for the Massey-Harris Co. Plans are being prepared.

BRIDGEBURG.—The Monarch Belt Co. which has large plants near Buffalo, N. Y., is understood to have selected Bridgeburg in which to locate its Canadian plant, owing to proximity to Buffalo. The company has under consideration the erection of a ten-story factory building covering three acres.

FORT WILLIAM.—The W. H. Dwyer Co., Ltd., has completed arrangements and signed contracts for the erection of a 100,000-bushel elevator fully equipped with drying and cleaning machinery on Island No. 2.

FORT WILLIAM.—Plans are matured for the financing of the Canadian Car & Foundry Co.'s new plant at Fort William. The cost will be in the vicinity of $1,500,000, and the funds will be raised by a bond issue. The plant will probably be completed by September and will immediately start to supply cars to meet the large Canadian demand.

GALT.—The Dominion Power & Transmission Co. has received a charter for its road from Hamilton to Galt and construction will be started shortly.

GALT.—The sum of $70,000 will be spent by the Water Commission this year on extension and improvements and a by-law to authorize this will shortly be submitted.

HAMILTON.—Bids are being considered by the Toronto, Hamilton & Buffalo railway for a second track from Welland to Smithville, Ont., a distance of over 16 miles.

IROQUOIS FALLS.—Details in regard to the new development of the Abiti Pulp & Paper Co., at Iroquois Falls show that of the 17,500 horsepower which will immediately be developed, about 15,000 will be used to run 18 ten-ton grinders and in addition about 3,000 horsepower of electrical energy will be utilized. The building will be completed by December 1.

NAPANEE.—One of the best equipped plants in the country is to be erected by the recently organized Napanee Brick & Tile Co. Among the directors are John L. Madill, of Napanee, and E. M. Young, of Picton, Ont.

OTTAWA.—The Dominion Bridge Co. has been awarded the steel contract for the new eight-story building to be put up by the Blackburn Estate.

OTTAWA.—The Dominion government has awarded a contract to the Marconi Co. of Canada for the erection of two stations at the terminals of the Hudson Bay railway, Port Nelson on Hudson Bay and Le Pas, Man.

OTTAWA.—The contract for the construction of the Morrisburg & Ottawa railway has been awarded to the Reliance Contract Co., of Chicago. The Ontario Hydro-Electric Commission is under bond to supply power for the road.

OTTAWA.—The new building of the American Bank Note Co., which will be constructed on Wellington street, east of the present building, will be four stories with basement, giving 45,000 square feet floor space. The cost will be about $100,000. J. C. Low and A. Garvok have the general contract and the Dominion Bridge Co. the steel contract.

PETERBORO.—The contract for the steel work on the new plant which Henry Hope & Son are putting up for the manufacture of steel sash has been awarded to the Hamilton Bridge Co.

SAULT STE. MARIE.—The H. E. Talbot Construction Co., of the Soo, has been awarded the contract for the construction of a power dam, power house, and two machine news print plants for the Donaconda Paper Co., at Donaconda, Que. The contract was signed in New York City recently, and involves a sum of $300,000. The Talbot Construction Co. also has a contract for a $500,000 paper plant and power house at Grand Mere, Que.

TILLSONBURG.—The citizens have ratified a by-law to loan $10,000 to the Tillsonburg Electric Car Co., with a free site and fixed assessment.

TORONTO.—The H. M. Kipp Co., Ltd., has been incorporated to manufacture motor vehicles; $40,000; by Herbert M. Kipp, Herbert W. Kipp and Francis H. Lemon, as provisional directors.

TORONTO.—The Forest Hill Electric railway has agreed to build a single track railway to connect York township with the city. The company will commence construction as soon as plans have been approved and will spend $50,000 the first year.

TORONTO.—The International Paper Co. has prepared plans for the construction of a $10,000,000 paper and pulp plant to be erected at Deschenes, Que. Plans and specifications are being prepared by a Toronto firm of architects.

TORONTO.—A permit has been issued by the city architect to Massey-Harris Co., maker of agricultural implements, for the erection of a four-story concrete pattern vault on the corner of King and Shaw streets, the structure to cost $70,000.

TORONTO.—The city council, after calling for tenders for a steel viaduct on Bloor street, has agreed to allow those who wish, to submit tenders on reinforced concrete construction, preparing their own plans and specifications. H. C. Hocken, mayor.

TORONTO.—The National Cash Register Co. has applied for a permit for its new factory buildings on Christie street, to cost approximately $250,000. The principal building will be 60 x 320 feet, two stories. Another facing the railway tracks and abutting on the first structure will be 54 x 240 feet, one story. The foundry will be 54 x 120 feet, one story. The Jackson Lewis Co., Ltd., is the contractor.

WELLAND.—The Standard Steel Construction Co. has been awarded a contract to build a $25,000 steel building for the Canada Forge Co.

WOODSTOCK.—The Harvey Knitting Co., Ltd., has issued preferred shares to maintain its output and cover the expense of putting in additional machinery.

QUEBEC

MONTREAL.—The contract for the enlargement of the Montreal city aqueduct has been awarded to the Cook Construction Co., of Sudbury for $2,322,562. The company has headquarters in Canada at Sudbury and in the United States at St. Paul, Minn.

MONTREAL. — The Dominion Mechanic Works, Ltd., has been incorporated to manufacture and deal in all kinds of apparatus and machinery; $20,000; by Sephirin Monte, Ernest Charette and Eugene Honore Godin, all of Montreal.

MONTREAL.—The C. P. R. has recently received thirty additional sleeping cars of a new kind. The Gold duplex system of hot water circulation, with Frunweller heater, is used while the lighting is of the individual electric lamp type.

MONTREAL.—Directors of the Hillcrest Collieries at a meeting last week ratified the sale of the entire product of the mines for a period of five years to the Canadian Pacific railway. A new plant was installed last year in the collieries, which are in Southern Alberta, and will be added to.

MONTREAL.—The new head office of the Fairbanks-Morse Co., Canadian extension, which will be built in Montreal will be a seven-story building, the seventh floor of which will be equipped as a repair shop. In the front there will be a demonstrating room where gasoline engines, pumps, etc., will be shown in operation.

MONTREAL.—In his annual address to the shareholders of the Montreal Power, Heat & Light Co., President Holt announced that a new gas station with an initial capacity of 4,000,000 cubic feet per day will be built in Montreal. A contract has been entered into with the Cedar Rapids Mfg. & Power Co. for the supply of 60,000 horsepower from the Cedars development and for this purpose a steel power transmission line will be erected. A new central auxiliary steam station of a capacity of 25,000 horsepower, with provision for ultimate capacity of 50,000 horsepower, is also planned.

STE. HYACINTHE.—Galbraith & Cote, engineering contractors of Montreal, have been given the contract for the construction of two steel and concrete bridges over the Yamaka river for $48,840.

SASKATCHEWAN

CARLYLE.—J. Haddin, an engineer employed by the town, has made a report on the question of drainage, sewage, and electric light, and recommends the expenditure of $45,000 on these schemes.

CANORA.—The Canora Mfg. Co., Ltd., commenced building operations last week on a general machinery and foundry works in which it will manufacture steel culverts and high-pressure water plants for fire and other purposes. Later the company expects to manufacture pumps. The building will be 40 x 80 feet and $12,000 worth of machinery will be installed. L. Ingraham is the general manager.

WEYBURN.—Tenders for large extensions projected at the city water pumping station have all been rejected by the council owing to the excessive figures quoted. It has been decided to do the work by day labor under the supervision of the city engineer. The necessary equipment will be purchased, and work started next month.